

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association
Contents are listed in the Education Index.

Copyright 1962

By National Education Association of the United States, Washington, D.C.

Volume XXXII, No. 1

February 1962

Educational and Psychological Testing

Reviews the literature for the three-year period since the
issuance of Vol. XXIX, No. 1, February 1959.

TABLE OF CONTENTS

Chapter	Page
Foreword	4
I. Testing and the Use of Test Results	5
FREDERICK B. DAVIS, <i>Hunter College, New York, New York</i>	
II. Development and Application of Tests of General Mental Ability	15
NORMAN E. WALLEN, <i>University of Utah, Salt Lake City, Utah</i>	
III. Development and Application of Tests of Special Aptitude	25
JOHN E. MILHOLLAND, <i>University of Michigan, Ann Arbor, Michigan</i> BENNO G. FRICKE, <i>University of Michigan, Ann Arbor, Michigan</i>	
IV. Development and Application of Tests of Educational Achievement	40
JACK C. MERWIN, <i>University of Minnesota, Minneapolis, Minnesota</i> ERIC F. GARDNER, <i>Syracuse University, Syracuse, New York</i>	
V. Development and Application of Structured Tests of Personality	51
RAYMOND A. KATZELL, <i>New York University, New York, New York</i> MILDRED E. KATZELL, <i>National League for Nursing, New York, New York</i>	
VI. Development and Application of Projective Techniques of Personality	64
HENRY RICCIUTI, <i>Cornell University, Ithaca, New York</i>	
VII. Development of Statistical Methods Especially Useful in Test Construction and Evaluation	78
WILLIAM B. SCHRADER, <i>Educational Testing Service, Princeton, New Jersey</i>	

<i>Chapter</i>	<i>Page</i>
VIII. Development and Application of Tests of Creativity.....	91
CALVIN W. TAYLOR, <i>University of Utah, Salt Lake City, Utah</i>	
JOHN L. HOLLAND, <i>National Merit Scholarship Corporation, Evanston, Illinois</i>	
IX. Review of This Issue.....	103
CHESTER W. HARRIS, <i>University of Wisconsin, Madison, Wisconsin</i>	
Index	108

Erratum

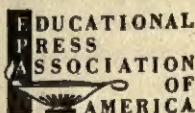
Vol. XXXI, No. 5, p. 468, ll. 13-14: *For* independent behavior displayed
 . . . *read* dependent behavior displayed by the child with his mother was
 positively correlated with dependent behavior in the nursery school.

This issue of the REVIEW was prepared by the
Committee on Educational and Psychological Testing

ERIC F. GARDNER, *Chairman*, Syracuse University, Syracuse, New York
FREDERICK B. DAVIS, Hunter College, New York, New York
CHESTER W. HARRIS, University of Wisconsin, Madison, Wisconsin
JOHN E. MILHOLLAND, University of Michigan, Ann Arbor, Michigan

with the assistance of

BENNO G. FRICKE, University of Michigan, Ann Arbor, Michigan
JOHN L. HOLLAND, National Merit Scholarship Corporation, Evanston,
Illinois
MILDRED E. KATZELL, National League for Nursing, New York, New York
RAYMOND A. KATZELL, New York University, New York, New York
JACK C. MERWIN, University of Minnesota, Minneapolis, Minnesota
HENRY N. RICCIUTI, Cornell University, Ithaca, New York
WILLIAM B. SCHRADER, Educational Testing Service, Princeton, New Jersey
CALVIN W. TAYLOR, University of Utah, Salt Lake City, Utah
NORMAN E. WALLEN, University of Utah, Salt Lake City, Utah



FOREWORD

This issue of the REVIEW, devoted to educational and psychological testing, follows the general organization of the past three issues on this topic and reviews studies reported since July 31, 1958. Two additional chapters have been included. In view of the current interest in creativity, its measurement, and its relationship to intelligence and aptitude, a separate chapter on the measurement of creativity has been added. Furthermore, since reviews of the REVIEW usually appear too late to be of significant value, it was considered desirable to add Chapter IX, which reviews the preceding contents of this issue.

Research studies related to education, and especially those dealing with educational and psychological testing, continue to appear in ever-increasing numbers. In the preparation of this issue, considerable selectivity was exercised in the choice of the studies to be reviewed, and considerable care taken to prevent excessive duplication. It is hoped that, as a result of efforts to operate within the space allocated to this topic, important contributions have not been overlooked or omitted.

ERIC F. GARDNER, *Chairman*
Committee on Educational and
Psychological Testing

CHAPTER I

Testing and the Use of Test Results

FREDERICK B. DAVIS

THE OUTSTANDING source of information about tests and testing to appear in the period covered by this REVIEW was *The Fifth Mental Measurements Yearbook*, edited by Buros (1959). This volume covered the years 1952 through 1958 and listed 957 tests. Many of these were evaluated in the 698 reviews written for the volume by 350 reviewers and in an additional 48 excerpts from reviews published elsewhere. As in previous issues of the *Yearbook*, segments of reviews of books on measurement and related fields were presented. The usefulness of the yearbooks rests primarily on the quality of the original reviews written for them; a high standard has been reached by the typical review in this edition. A new bibliography of tests published in all English-speaking countries, also edited by Buros, is scheduled to be published in 1962 under the title, *Tests in Print*. It will serve also as a master index for all issues of the yearbooks.

Two issues of the *Test Service Bulletin*, published by the Psychological Corporation, contained articles by Ricks (1959) and Wesman (1958). The first dealt with problems and techniques of explaining test results to students and their parents, the second with the comparability and equivalence of test scores.

Test Development

The development of several tests for classification of airmen in the U.S. Air Force was reported (Brokaw, 1960; Lecznar and Davydiuk, 1960). Lecznar (1961) described the test currently in use in the airman-classification program, a four-hour test comprising four subtests and yielding four aptitude scores.

Two tests were developed especially for identifying gifted elementary-school children. The first of these, according to F. B. Davis and others (1960), consists of a long test in two parallel forms designed for administration to children aged five to seven. The test yields scores in word knowledge, space conceptualization, number facility, reasoning ability, and science information. The average intercorrelation of the five scores was only .44, although their average reliability coefficient was about .90. Because the tests were designed to differentiate among children in the top 20 percent of the American population, children below the eightieth percentile tended to obtain scores no higher than chance would permit. The second of the new tests was used in a study reported by Lesser and Davis

(1960). They predicted the performance of gifted children in a third-grade science course on the basis of scores derived from this test, which was administered at the beginning of the course. The validity coefficient obtained, .76, was essentially as high as permitted by the reliability coefficients of the tests and of the criterion.

In a study pertaining to the selection and preparation of items in test development, Cook (1958) compared the difficulty and internal consistency of multiple-choice items for which the distracters were written in the usual way, with items for which the distracters were obtained from incorrect responses by examinees to the same items given in free-response form. He found no significant differences in either discrimination or difficulty indexes between the two groups of items.

Test Selection

Three papers, presented by Ebel (1959), Flanagan (1959), and Wesman (1959) at the Invitational Conference on Testing Problems in 1958, dealt with aspects of the more specific problem of selecting tests for college admissions and scholarship programs. Ebel stressed the need for tests of substantive knowledge in relevant subject-matter areas, rather than tests of innate or developed aptitudes. Wesman emphasized the diversity of purposes and types of students that make any one testing program inappropriate for universal adoption.

In a paper dealing with a different aspect of the problem of selecting students for admission to college, Fishman (1958) discussed the merits and demerits of various criteria for judging the validity of admissions tests.

Additional Reference: Educational Testing Service (1958).

Use of Tests

Traxler's (1959) estimate of 122 million standardized tests administered in 1958 pointed to the need for careful planning of testing programs. Traxler (1960) discussed the principles of establishing a good testing program. Thompson (1958) set up tentative guidelines for determining proper and improper practices in the use of standardized achievement tests. He named 29 practices: 12 acceptable, 17 unacceptable. The American Council on Education (1958, 1959), through its Committee on Measurement and Evaluation, surveyed the use of tests in colleges and universities. Suggestions were made for improving the use of tests in admission, placement, instruction, and counseling, and in testing programs in seven representative colleges.

Hastings (1960) and Hastings, Runkel, and Damrin (1960) have investigated the use of tests in schools and the effects on the use of tests by teachers of a summer institute in testing. Among their conclusions were

the following: (a) The presence of guidance counselors in schools tended to increase (not decrease, as might have been expected) the guidance activities of other staff members. (b) In schools with guidance and testing programs, students' reports of the teachers' understanding of them did not differ from such reports by students in schools without guidance and testing programs. (c) About three-fourths of the students in schools, both with and without testing and guidance programs, got their vocational information from sources outside the schools. They also concluded that, in general, trainees in a summer institute improved their knowledge of tests and test interpretation, came to weigh subjective data more heavily than before in making decisions about pupils, maintained about the same attitudes toward the usefulness of tests in counseling students, and were greatly influenced in their views of what ought to be expected of a school counselor.

Project Talent was explained in a series of articles by Flanagan (1960) and Flanagan and others (1960), by the University of Pittsburgh Project Talent staff (1959, 1960, 1961), and by Dailey and Shaycoft (1961). The purposes and extent of the Project and the tests and report forms used in it were described in detail. The Project will provide the first truly comprehensive inventory of the intellectual talents of American youth. A set of basic norms, to which many standardized tests may be anchored, will be established. The projected follow-up studies will, ultimately, yield data crucial for informed educational and vocational guidance. The contributions of the Project will depend, finally, on the excellence of the tests administered.

Additional References: Hill (1959); Traxler (1960).

Test Administration

Brokaw (1959) described the use of three common statistical techniques in detecting anomalies in a score distribution where nonstandard test administration had resulted in shifting of the scores of a group of examinees from their proper places in the distribution. Gordon (1958) found that the right-handed design of the test materials had no significant effect on left-handed testees when the tests were unsped. In clerical speed tests, however, a significant difference was found, showing left-handed examinees to be at a disadvantage. Whitcomb (1958) reported that speed of marking the IBM answer sheet was a factor of considerable importance in determining scores on a speed test of a simple function. He suggested that separate norms be established for answer-sheet and write-in administration for such tests.

Mollenkopf (1960) suggested that test directions always should state, in full, the conditions of testing, such as the time limit; that a test measures different mental functions when administered under power or speed con-

ditions; that for some tasks, speed is an essential element; and that test scores be expressed as the number of items marked correctly plus a fraction, with the number of items not marked as the numerator and the number of choices per item as the denominator. Wesman (1960) agreed that speed is sometimes part of the criterion variable that a test is designed to measure; only in such circumstances did he favor using speeded tests. Morrison (1960) discussed the effects of speed conditions on the performance of examinees and provided an excellent bibliography on this topic.

Curtis and Kropp (1961) compared the scores of examinees on the widely used *School and College Ability Test*, Form 3A, when the test was given normally and when it was given by projecting the items on a simulated television screen. In general, scores were not significantly different.

Test Scoring

Phillips and Weathers (1958) tabulated the errors made by teachers in 5017 scorings of parts of the *Stanford Achievement Test*. Twenty-eight percent of the tests showed one or more errors in scoring. Scoring errors occurred in the following operations, in order of frequency: (a) counting marks, (b) following instructions, (c) using the key, (d) using tables, and (e) making computations.

Graesser (1958) discussed the use of the conventional test-scoring formula for correction for chance success. He concluded that if only knowledge and guessing are employed in responding to multiple-choice items, it usually does not pay the examinee to guess when the conventional formula for correction for chance is employed. These conclusions do not conflict with the well-known fact that the examinee should use partial information to rule out as many choices as possible so that guessing among the remainder will pay even when the correction formula is used.

F. B. Davis (1959d) reanalyzed data, originally compiled by others, pertaining to the correction for chance success in test scoring. The original authors had administered 148 difficult true-false items to 100 college-student volunteers. The students indicated for each item whether they (a) marked it with confidence, (b) marked it with some doubt, (c) marked it on the basis of a guess, or (d) left it unmarked in order to avoid guessing. Accepting the examinees' introspections as correct, the average number of items marked correctly on the basis of adequate knowledge was 23.23, the average number marked correctly on all bases was 76.08. The average score after correction for chance success by the conventional formula (in this case, number correct minus number wrong) was 14.85. This comes closer to the assumed knowledge score of 23.23 than to the average number of items marked correctly, 76.08. F. B. Davis (1959d) discussed this result and its implications, which support the use of the conventional correction for chance success.

Additional References: Basumallik (1959); Crawford (1959).

Test-Score Reporting

North (1959) summarized the policies and practices followed in releasing test results by private schools which are members of the Educational Records Bureau. He noted that the schools generally released a large part of the test data they obtained. Horst (1959) offered three recommendations for counselors in reporting test results to students: (a) Find out what the scores mean. (b) Explain the scores to the students. (c) Do your best to get the students to act in accord with the data. Durost (1959) strongly advocated the use of stanine scores based on local testing data for reporting scores to teachers, pupils, and parents. A slight modification of the basis commonly used for establishing stanine scores was recommended by Kaiser (1958) to make the standard deviation of such scores more nearly approach 2.00. A graphic representation of a student's test scores, designed to permit easy comparison of his scores with those of his classmates and of the American population, was described by Zeigler, Bernreuter, and Ford (1958).

Additional Reference: Durost (1961).

Test-Score Interpretation

A basis for the scientific interpretation of test scores was provided in two papers by F. B. Davis (1959b, c). Beginning with a practical adaptation of T. L. Kelley's standard error of measurement of the difference between two standard scores, first published in 1923, Davis provided procedures for properly evaluating differences between (a) each of several scores obtained by an individual and his average on all of them, (b) a score obtained by an individual and his average score on several other tests, (c) a score obtained by an individual and the average score in a group of which the individual is a member, (d) a score obtained by an individual and the average score in a group of which the individual is not a member, (e) a score of an individual and the average score of a sample from a defined population (e.g., a norms group), (f) the average score of an individual on several forms of the same test and his average score on several forms of another test, (g) the average score of a class and the average score of a school or grade group in which the class is included, and (h) the average scores of any particular group or groups on two forms of the same test or different tests.

The first and second differences are involved in the so-called diagnostic signs derived from the Wechsler intelligence scales. The others form bases for comparisons that are almost always involved in interpreting test scores. To make possible scientific interpretation of test scores without the need for computing the confidence intervals and standard errors of measurement of differences inevitably required for such a process, F. B. Davis

(1959a) prepared tables that provide the necessary data for interpretation of tests commonly used by school psychologists and clinicians.

One of the encouraging trends during the period under review was the attention paid by test publishers to the proper interpretation of test scores. For example, the California Test Bureau (1958) offered a great deal of interpretive information pertaining to the *California Test of Mental Maturity*. The College Entrance Examination Board (CEEB) (1958) provided information regarding the interpretation of CEEB scores. This information has proved valuable for secondary-school administrators, guidance counselors, and teachers. Accompanying the new series of the *Cooperative English Tests* is a *Manual for Interpreting Scores*, published by the Educational Testing Service (1960), that should be of considerable assistance to test-users with respect to the meaning of percentile bands and converted scores. The *Davis Reading Test, Series 1: Manual*, by F. B. Davis and C. C. Davis (1958), presented the data required for properly evaluating differences between individual scores and gave detailed instructions for the use of these data.

Anderson (1958) called attention to the fact that systematic fluctuation occurs from one time to another, as from morning to afternoon, in many variables commonly measured by tests. He suggested that test publishers obtain and present such information. J. A. Davis (1959) pointed out pitfalls in the interpretation of the college profiles now widely used by counselors in estimating how well a high-school pupil is likely to perform scholastically in each of several colleges. Davis warned that such interpretations may prove misleading because the extent to which scores on a given test predict academic performance varies widely from college to college and—of even greater practical consequence to the individual counselee—from instructor to instructor. Muldoon and Ray (1958) studied the characteristics of five-point test profiles of 19 individuals used by 11 clinicians in their interpretations. The data showed that the clinicians paid most attention to the shape of the profile (represented most closely statistically by du Mas's coefficient of profile similarity), next most attention to scatter in the profile, and least attention to the general elevation of scores in the profile.

Assessment of Change

Lord (1958) discussed four problems in the measurement of growth: (a) estimating the gain of each individual, (b) correlating gains with other variables, (c) comparing gains made by students who obtained low initial scores with gains made by students who obtained high initial scores, and (d) comparing numerically equal gains made by students with different initial scores. F. B. Davis (1961) pointed out that since the primary purpose of teaching is to produce improvement in the learner, the most important objective of evaluation in education is to estimate changes in

Individual learners and in groups of learners. He considered several aspects of the problem of measuring these changes: (a) obtaining appropriate measuring instruments, (b) securing consistently good rapport with examinees, (c) selecting tests with appropriate norms, and (d) estimating the amount of change and its statistical significance. With regard to the last point, he presented five methods for measuring individual change and three ways of measuring group change and provided a convenient procedure for estimating the statistical significance of change measured by any of the eight procedures. The most accurate of these methods for estimating individual and group change are based on the same multiple-regression procedure proposed by Lord. However, Davis described the procedure in terminology familiar to students of educational measurement.

Mitzel and Gross (1958) reviewed measures of growth which had been developed as criteria of effective teaching in 20 research studies conducted between 1921 and 1951.

It is surprising that textbooks in educational measurement and evaluation have provided so little material relating to the estimation of pupil growth or change. It is possible that articles in recent years by Lord, McNemar, and F. B. Davis will stimulate interest among textbook writers and test publishers.

Additional References: Bliesmer (1958); Little (1960).

Measurement Theory

Bechtoldt (1959) contributed a detailed and closely reasoned critical analysis of the concept of construct validity and concluded by recommending that it be discarded as having no value. Cureton (1958) stated the logical foundations of the concept of reliability of measurement and critically examined methods for computing it. He concluded by recommending that the reliability coefficient of an objective test be estimated as the correlation coefficient between equivalent forms of the test administered at times separated by an interval judged optimal by the experimenter. Considerations involved in making this judgment were discussed. For tests of many functions, he suggested that the first of the equivalent forms be given on the morning of a day early in the week and that the second be given in the afternoon of a day late in the following week. He defined equivalent forms of a test as those having identical reliability coefficients and measuring the same mental functions. Finally, he indicated that, in his opinion, internal-consistency reliability coefficients, such as coefficient alpha, the various Kuder-Richardson coefficients, and split-half coefficients, greatly overestimate the practical reliability of tests.

Bibliography

AMERICAN COUNCIL ON EDUCATION, COMMITTEE ON MEASUREMENT AND EVALUATION. "Improving Measurement in Higher Education." *Educational Record* 39: 392-95; October 1958.

- AMERICAN COUNCIL ON EDUCATION, COMMITTEE ON MEASUREMENT AND EVALUATION. *College Testing: A Guide to Practices and Programs*. Washington, D.C.: the Council, 1959. 189 p.
- ANDERSON, CHARLES C. *Function Fluctuation*. British Journal of Psychology Monograph Supplements, No. 30. London: Cambridge University Press, 1958. 104 p.
- BECHTOLDT, HAROLD P. "Construct Validity: A Critique." *American Psychologist* 14: 619-29; October 1959.
- BROKAW, LELAND D. *Some Statistical Methods for Detection of Nonstandard Test Administration*. Technical Note WADC-TN-59-34. Lackland Air Force Base, Texas: Personnel Laboratory, Wright Air Development Center, Air Research and Development Command, 1959. 30 p.
- BROKAW, LELAND D. *Suggested Composition of Airman Classification Instruments*. Technical Note WADD-TN-60-214. Lackland Air Force Base, Texas: Personnel Laboratory, Wright Air Development Division, Air Research and Development Command, 1960. 48 p.
- BUROS, OSCAR K., editor. *The Fifth Mental Measurements Yearbook*. Highland Park, N.J.: Gryphon Press, 1959. 1292 p.
- CALIFORNIA TEST BUREAU. *Technical Report on the California Test of Mental Maturity*. 1957 edition. Los Angeles: the Bureau, 1958. 32 p.
- COLLEGE ENTRANCE EXAMINATION BOARD. *College Board Score Reports*. New York: the Board, 1958. 31 p.
- ✓COOK, DESMOND L. "The Use of Free Response Data in Writing Choice-Type Items." *Journal of Experimental Education* 27: 125-33; December 1958.
- CURETON, EDWARD E. "The Definition and Estimation of Test Reliability." *Educational and Psychological Measurement* 18: 715-38; Winter 1958.
- ✓CURTIS, HAZEN A., and KROPP, RUSSELL P. "A Comparison of Scores Obtained by Administering a Test Normally and Visually." *Journal of Experimental Education* 29: 249-60; March 1961.
- DAILEY, JOHN T., and SHAYCOFT, MARION F. *Types of Tests in Project Talent: Standardized Aptitude and Achievement Tests*. Cooperative Research Monograph No. 9. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1961. 62 p.
- DAVIS, FREDERICK B. *Aids for Interpreting Test Scores*. New York: Hunter College, 1959. 25 p. (a)
- DAVIS, FREDERICK B. "Interpretation of Differences Among Averages and Individual Test Scores." *Journal of Educational Psychology* 50: 162-70; August 1959. (b)
- DAVIS, FREDERICK B. "Standard Errors of Measurement of Differences Important for Diagnosing the Aptitude and Achievement of Individuals." *Sixteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1959. p. 130-33. (c)
- DAVIS, FREDERICK B. "The Use of Correction for Chance Success in Test Scoring." *Journal of Educational Research* 52: 279-80; March 1959. (d)
- DAVIS, FREDERICK B. "The Assessment of Change." *Tenth Yearbook of the National Reading Conference*. Milwaukee: Marquette University, Reading Center, 1961. p. 86-99.
- DAVIS, FREDERICK B., and DAVIS, CHARLOTTE C. *Davis Reading Test, Series 1: Manual*. New York: Psychological Corporation, 1958. 20 p.
- DAVIS, FREDERICK B., and OTHERS. "Identification and Classroom Behavior of Gifted Elementary School Children." *The Gifted Student*. Cooperative Research Monograph No. 2. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1960. p. 19-32.
- DAVIS, JUNIUS A. "Non-Apparent Limitations of Normative Data." *Personnel and Guidance Journal* 37: 656-59; May 1959.
- DURST, WALTER N. "The Use of Local Stanines in Reporting Test Results in a Large Cosmopolitan School System." *Sixteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1959. p. 140-48.
- EBEL, ROBERT L. "What Kinds of Tests for College Admission and Scholarship Programs?" *Proceedings, Invitational Conference on Testing Problems*, 1958. Princeton, N.J.: Educational Testing Service, 1959. p. 88-97.
- EDUCATIONAL TESTING SERVICE. *Cooperative English Tests: Manual for Interpreting Scores*. Princeton, N.J.: the Service, 1960. 41 p.

- FISHMAN, JOSHUA A. "Unsolved Criterion Problems in the Selection of College Students." *Harvard Educational Review* 28: 340-49; Fall 1958.
- FLANAGAN, JOHN C. "Criteria for Selecting Tests for College Admissions and Scholarship Programs." *Proceedings, Invitational Conference on Testing Problems, 1958*. Princeton, N.J.: Educational Testing Service, 1959. p. 98-103.
- FLANAGAN, JOHN C. "Project Talent: The First National Census of Aptitudes and Abilities." *Seventeenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1960. p. 37-44.
- FLANAGAN, JOHN C., and OTHERS. *Designing the Study*. Project Talent Monograph No. 1. Pittsburgh: University of Pittsburgh, December 1960. 450 p.
- GORDON, LEONARD V. "Right-Handed Answer Sheets and Left-Handed Testees." *Educational and Psychological Measurement* 18: 783-85; Winter 1958.
- GRAESSER, ROY F. "Guessing on Multiple-Choice Tests." *Educational and Psychological Measurement* 18: 617-20; Autumn 1958.
- HASTINGS, J. THOMAS. *The Use of Test Results*. U.S. Office of Education Cooperative Research Project No. 509. Urbana: Bureau of Educational Research, University of Illinois, 1960. 223 p. (Mimeo.)
- HASTINGS, J. THOMAS; RUNKEL, PHILIP J.; and DAMRIN, DORA. *Effects on Use of Tests by Teachers Trained in a Summer Institute*. Vol. 1. U.S. Office of Education Cooperative Research Project No. 702. Urbana: Bureau of Educational Research, University of Illinois, 1960. 213 p. (Mimeo.)
- HORST, PAUL. "How Much Information on Test Results Should Be Given to Students: Views of a Research Psychologist." *Journal of Counseling Psychology* 6: 218-22; Fall 1959.
- KAISER, HENRY F. "A Modified Stanine Scale." *Journal of Experimental Education* 26: 261; March 1958.
- LECZNAR, WILLIAM B. *Development of the Airman Classification Test 1961*. Technical Note ASD-TN-61-42. Lackland Air Force Base, Texas: Personnel Laboratory, Aeronautical Systems Division, Air Force Systems Command, 1961. 11 p.
- LECZNAR, WILLIAM B., and DAVYDIUK, BEVERLY F. *Airman Classification Test Batteries: A Summary*. Technical Note WADD-TN-60-135. Lackland Air Force Base, Texas: Personnel Laboratory, Wright Air Development Division, Air Research and Development Command, 1960. 17 p.
- LESSER, GERALD S., and DAVIS, FREDERICK B. *The Identification of Gifted Elementary School Children with Exceptional Scientific Talent*. U.S. Office of Education Cooperative Research Project No. 392. New York: Educational Clinic, Hunter College, 1960. 58 p. (Mimeo.)
- LORD, FREDERIC M. "Further Problems in the Measurement of Growth." *Educational and Psychological Measurement* 18: 437-51; Autumn 1958.
- MITZEL, HAROLD E., and GROSS, CECILY F. "Development of Pupil-Growth Criteria in Studies of Teacher Effectiveness." *Educational Research Bulletin* 37: 178-87; October 8, 1958.
- MOLLENKOPF, WILLIAM G. "Time Limits and the Behavior of Test Takers." *Educational and Psychological Measurement* 20: 223-30; Summer 1960.
- MORRISON, EDWARD J. "On Test Variance and the Dimensions of the Measurement Situation." *Educational and Psychological Measurement* 20: 231-50; Summer 1960.
- MULDOON, JOHN F., and RAY, OAKLEY S. "A Comparison of Pattern Similarity as Measured by Six Statistical Techniques and Eleven Clinicians." *Educational and Psychological Measurement* 18: 775-81; Winter 1958.
- NORTH, ROBERT D. "Policies and Practices of ERB Member Public Schools in Releasing Test Results." 1959 *Achievement Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin No. 74. New York: Educational Records Bureau, 1959. p. 90-104.
- PHILLIPS, BEEMAN N., and WEATHERS, GARRETT. "Analysis of Errors Made in Scoring Standardized Tests." *Educational and Psychological Measurement* 18: 563-67; Autumn 1958.
- RICKS, JAMES H. "On Telling Parents About Test Results." *Test Service Bulletin*. No. 54: 1-4; December 1959.
- THOMPSON, ANTON. "Tentative Guidelines for Proper and Improper Practices with Standardized Achievement Tests." *California Journal of Educational Research* 9: 159-66; September 1958.
- TRAXLER, ARTHUR E. "Standardized Tests." *NEA Journal* 48: 18-20; November 1959.

- TRAXLER, ARTHUR E. "Educational Measurement: An Aid to School Administration." *School Review* 68: 196-209; Summer 1960.
- UNIVERSITY OF PITTSBURGH, PROJECT TALENT OFFICE. *The Story of Project TALENT*. Bulletin No. 1. Washington, D.C.: the University, 1959. 8 p.
- UNIVERSITY OF PITTSBURGH, PROJECT TALENT OFFICE. *News of Project TALENT*. Bulletin No. 2. Washington, D.C.: the University, 1960. 8 p.
- UNIVERSITY OF PITTSBURGH, PROJECT TALENT OFFICE. *Project TALENT News*, No. 1. Pittsburgh: the University, July 1961. 4 p.
- WESMAN, ALEXANDER G. "Comparability vs. Equivalence of Test Scores." *Test Service Bulletin* No. 53: 1-4; September 1958.
- WESMAN, ALEXANDER G. "What Kinds of Tests for College Admission and Scholarship Programs?" *Proceedings, Invitational Conference on Testing Problems*, 1958. Princeton, N.J.: Educational Testing Service, 1959. p. 114-20.
- WESMAN, ALEXANDER G. "Some Effects of Speed in Test Use." *Educational and Psychological Measurement* 20: 267-74; Summer 1960.
- WHITCOMB, MILTON A. "The IBM Answer Sheet as a Major Source of Variance on Highly Speeded Tests." *Educational and Psychological Measurement* 18: 757-59; Winter 1958.
- ZEIGLER, MARTIN L.; BERNREUTER, ROBERT G.; and FORD, DONALD H. "A New Profile for Interpreting Academic Abilities." *Educational and Psychological Measurement* 18: 583-88; Autumn 1958.

Additional References

- BASUMALLIK, T. "Reliability of Essay-Type Examinations: A Review of Studies." *Journal of Educational Psychology* (Baroda, India) 17: 127-56; October 1959.
- BLIESMER, EMERY P. "Methods of Evaluating Progress of Retarded Readers in Remedial Reading Programs." *Fifteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1958. p. 128-34.
- CRAWFORD, D. H. "An Introductory Study of the Consistency of Marking Mathematics Papers in Schools." *Alberta Journal of Educational Research* 5: 31-40; March 1959.
- DUROST, WALTER N. "How To Tell Parents About Standardized Test Results." *Test Service Notebook*, No. 26. Tarrytown, N.Y.: Harcourt, Brace and World, 1961. 4 p.
- EDUCATIONAL TESTING SERVICE. *Selecting an Achievement Test: Principles and Procedures*. Evaluation and Advisory Service Series, No. 3. Princeton, N.J.: the Service, 1958. 32 p.
- HILL, GEORGE E. *Evaluating the School's Testing Program*. Athens: Center for Educational Service, Ohio University, 1959. 28 p.
- LITTLE, ELLIS B. "Pre-Test and Re-Test Scores in Retention Calculation." *Journal of Experimental Education* 29: 161-67; December 1960.
- TRAXLER, ARTHUR E. "Use of Results of Large-Scale Testing Programs in Instruction and Guidance." *Journal of Educational Research* 54: 59-62; October 1960.

CHAPTER II

Development and Application of Tests of General Mental Ability

NORMAN E. WALLEN

THIS CHAPTER is concerned with tests which purport to provide an overall index of intellectual skills. Although such tests appear to be becoming more objectionable to many researchers on the grounds that they lack theoretical bases or that they fail to do justice to all aspects of human intellect, they nevertheless continue to demonstrate great usefulness in many applied and research activities.

Throughout this review, an attempt has been made to indicate the specific test used; the reader should keep in mind that results cited for a test do not necessarily generalize to all tests classified under the heading being discussed.

During the period reviewed, the largest number of studies pertained to predictive validity and analysis of test intercorrelations. There appeared to be an increase in studies contributing to knowledge of construct validity through the study of predicted relationships to such variables as ease of learning and cultural characteristics; this trend is encouraging. Of the persistent issues, only a few associated with measures of general ability appeared to be reaching the stage where a fairly definitive answer would be possible.

Reliability

When reliability is defined as the attenuation of measurement by short-term fluctuation in individual characteristics and variability in sampling task content, the tests discussed here have, over the years, demonstrated high reliability. Studies assessing the effect of long-term changes in individuals—the stability problem—have been less common, however.

Bradway, Thompson, and Cravens (1958) reported on the follow-up of approximately 100 subjects from the 1937 Stanford-Binet standardization sample. When initially tested, the subjects ranged from two to five-and-a-half years of age. The correlation with scores obtained 10 years later was .65; with scores obtained 25 years later, .59. The correlation between scores in adolescence and 15 years later was .85. Taking into account the often-demonstrated low predictive value of tests given subjects below age five, these data are impressive. They are consistent with previous studies and demonstrate that a preschool Binet IQ does predict subsequent intellectual functioning as measured by the same test. At the same time, the correlations demonstrated that IQ is not absolutely constant. Some of the factors likely to contribute to IQ fluctuation will be discussed in a later

section of this review. Findings in these studies also added to the accumulating evidence that intellectual improvement continues into adulthood.

Follow-up studies with the Wechsler tests have been rare. Duncan and Barrett (1961) reported a correlation of .82 over a 10-year period for a group of superior adults, but they used only 28 cases.

There was evidence that low IQ scores are more stable. Collmann and Newlyn (1958), studying 182 retarded children, found a correlation of .93 between Stanford-Binet scores at the beginning and end of a one-year period. Sharp (1958), using the *Leiter International Performance Scale* for similar subjects, reported a correlation of .91 after a period of six months or longer. Stott (1960) reported a correlation of .80 for Stanford-Binet scores of low-IQ subjects over a one-to-three-year interval. These findings fit the concept of the "twisted pear" phenomenon discussed by Fisher (1959), which suggests that a simple linear treatment of the relationship between two variables overlooks the possibility of greater predictability at one or both extremes.

Predictive Validity

A substantial number of studies reported relationships between academic performance in a variety of content areas and group tests, which usually had substantial "educational loading." In general, the correlations reported are consistent with previous studies, the range being approximately .30 to .60, with prediction best in the more academic subjects. Although of considerable value to persons concerned with prediction in these areas, these studies, in the reviewer's opinion, contributed little to general knowledge. An exception is the study by Holland (1959), which found, with a sample of highly select National Merit Scholarship winners, that the *College Entrance Examination Board (CEEB) Scholastic Aptitude Test* scores, verbal and mathematical, had generally low (.17 or below) predictive ability for college grades. The finding did not appear to be completely explained by restriction of range of predictor and criteria; the correlation with verbal scores ranged from .09 to .49.

Plant and Lynd (1959) reported an exception to the usual finding that tests with the most "educational content" predict college success best. The *Wechsler Adult Intelligence Scale (WAIS)* predicted freshman grades better than the *American Council on Education (ACE) Psychological Examination for College Freshmen*, though the difference was not significant (.58 versus .46). Three studies reported validities of .40 for the *Graduate Record Examinations* as applied to graduate performance in education (Law, 1960), in chemistry (Michael, Jones, and Gibbons, 1960), and across various academic areas (King and Besco, 1960). Nisbet and Buchan (1959) reported positive, but low, predictions of college grades from scores obtained at age 11 on Britain's "eleven-plus" examination for a select sample.

Ability To Learn

In spite of the not uncommon statement that intelligence tests do not predict ability to learn, the evidence that they do continues to accumulate—though not without exception. The frequent reference to apparently negative results of early studies illustrates the difficulties that arise from lack of research sophistication; these studies abound in unreliable measures, regression effects attributable to errors of measurement, lack of variability, and lack of specificity of the learning task. Relationships between IQ (and/or mental age) and various laboratory learning tasks were demonstrated in several recent studies, for example, those by Ellis and others (1960) and Girardeau (1959). It is interesting that two of the studies which failed to find any relationship, by Eisman (1958) and Akutagawa and Benoit (1959), used paired associates as the learning task. Another study, by Cieutat and Cieutat (1961), which did find a relationship between paired-associate learning and a test of general verbal ability, found that the relationship decreased as meaningfulness of the terms increased. The notion that intelligence tests predict better for more complex learning tasks was supported in a study by Noble, Noble, and Alcock (1958). Whether prediction is better based on mental age or IQ remains to be seen. Most studies have not systematically varied all three relevant variables (chronological age, mental age, and IQ). Relationships tend to be found between whichever two are permitted to vary.

Wallen (1959) developed a group test of auditory discrimination learning and found a correlation of .40 with Lorge-Thorndike nonverbal scores. Cline, Beals, and Seidman (1960) found that *Army General Classification Test* scores predicted success in learning various military tasks, such as map reading and carbine assembly. Studies by Klausmeier and Feldhusen (1959) and Klausmeier and Loughlin (1961) applied such findings more directly to the classroom. They found that efficacy of approach to problems of arithmetic comprehension was in proportion to IQ, measured by the *Wechsler Intelligence Scale for Children (WISC)*, for low-, middle-, and high-IQ subjects. They also found differences in arithmetic retention that were significant at the .05 level, but chose to disregard them because the .01 level was not reached. The nature of these differences suggests better immediate retention by the higher-IQ subjects, their advantage decreasing with time.

A particularly interesting study was that of Berkson and Cantor (1960), who employed a sophisticated design to test the extent of symbolic mediation. Each child learned associations between numbers and pictures and then between the same pictures and colors. The mediation effect was measured by a test of number-to-color association. The higher-IQ children (as determined by the *Kuhlmann-Finch Tests*) learned the lists significantly faster, but did not show the greater mediation effect that was expected. This finding is difficult to reconcile with that of O'Connor and Hermelin (1959), who found both faster learning and greater transfer in normals than in

retarded children. An interesting point in this study is that since the transfer was negative (i.e., it interfered with learning), the retarded performed better on this aspect of the test because they did not transfer. Further, it was demonstrated that the poorer performance of the normals resulted from their verbalizing the rule; the retarded showed as much negative transfer after they also were finally able to verbalize the rule.

Studies relating test performance to various aspects of learning continued to be plagued with the problem of adequate measures of learning. This research area deserves the increasing attention it has been getting.

Ability and Capacity

An issue of great importance is the distinction between present ability and capacity. The use of an intelligence-test score to indicate an individual's over-all functioning on a variety of intellectual tasks appears justified in the light of accumulated research, although, even here, the differences among tests on such dimensions as "educational loading" must be kept in mind. Further, such scores may be legitimately used to predict future performance in a variety of situations. When the question of intellectual capacity is raised, however, what is asked for is an estimate of the individual's intellectual functioning in the future under optimal conditions, which are usually undefined. Although answers to such questions often must be given in practical situations, it is widely recognized that they rest on very little scientific support. It is not appropriate here to discuss all the variables, in addition to the test score, that a psychologist must consider in arriving at an estimate of intellectual capacity, but it is appropriate to examine approaches to test development that have attempted to provide better assessments of capacity than the usual highly verbal type of test.

The most common approach to the problem has been through use of performance tasks as exemplified by the *WAIS* performance tests and the *Leiter International Performance Scale* or nonverbal tasks as exemplified by the nonverbal forms of the *Lorge-Thorndike Intelligence Tests* and Raven's *Progressive Matrices*, which were reviewed by Burke (1958). Both types of tasks are less dependent on words than are usual tests; the performance task usually requires manipulation of materials, whereas the nonverbal task is usually a paper-and-pencil test. Such tests are intended to be as little dependent as possible on specific experiences, particularly of a schooling nature. But the type of research needed has not, to the reviewer's knowledge, been done. It is not known whether children whose performance scores are considerably higher than their verbal scores profit more from remedial or therapeutic experience than children with comparable verbal scores whose performance scores are not deviant. It is known that in the absence of special treatment, verbal scores predict better; but this is a different question.

In the absence of direct evidence, present related evidence is contradictory. It would be expected, if the logic holds, that groups experiencing a less "desirable" environment would show less impairment on performance tasks than on verbal tests. Studies of other cultures (Walters, 1958) and of Negroes versus whites (Shuey, 1958) consistently showed either no difference or a poorer performance by "culturally deprived" subjects than by control subjects on the nonverbal, as compared with the verbal, tests. On the other hand, a series of studies by Levinson (1960) supported his position that a particularly stimulating verbal environment has a cumulative effect of raising verbal skills above performance skills. Warren (1960) compared the language and nonlanguage scores, as well as total scores, on the *California Test of Mental Maturity* in predicting grades for two samples of high-school students in an American school in Japan. The total scores predicted equally well for the group speaking their native English and for the group speaking various native Asian languages. However, the prediction from the language score was significantly better for the native-English-speaking group than for the Asian group, and the reverse was true for the nonlanguage score.

The *Davis-Eells Games*, constructed especially to provide a "fairer" measure for low socioeconomic groups, was found to correlate negligibly with social status in a study by Noll (1960); but in another study by Knief and Stroud (1959), which was consistent with most previous findings, the *Davis-Eells Games* discriminated according to social classes about as much as other tests.

Environmental Variables Affecting Intelligence

The continued study of the influence of environmental variables on test performance is closely related to the stability of score and the search for measures of capacity, which have been discussed above. Burt (1961) continued to defend his position that environmental factors contribute relatively little, while Anastasi (1958) argued for their importance. The issue is not yet settled and continues despite repeated efforts to brand it a pseudoproblem or an irrelevancy. A number of recent studies dealt with variables which seemed to make some difference, although it was not clear how much. Hurley (1959) cited two studies that found that the children of domineering parents are likely to have lowered performances on intelligence tests, although one of these studies found that such home influence was beneficial to achievement-test performance. Levinson's (1959) study was consistent with previous studies showing that children from bilingual homes score lower on individual, as well as group, verbal tests. It has not been demonstrated that this is due to environmental influence rather than to heredity. According to Jones (1960), several studies reported lower performance on nonverbal tests as well.

Variables Affecting Test Performance

A number of the variables affecting test performance were investigated: among them were subject co-operativeness, knowledge of results, ego-involving instructions, success, effect of examiners, test anxiety, previous educational experience, coaching, and speed. Masling (1959) found significantly higher scores on three *WAIS* subtests when the testee assumed the role of a congenial, co-operative person than when she was aloof and hostile. The magnitude of the differences, however, appeared to be slight in view of the extreme roles played. Nichols (1959) found that immediate knowledge of results given to college students had no effect on subsequent *WAIS* scores, nor did ego-involving instructions. He also found no significant differences among 11 examiners. Among several studies that found low negative correlations between performance and test anxiety was that by Broen (1959).

It is not surprising that general (Deignan, 1959) and specific (Pallone, 1961) educational experience positively affected performance on such tests as the *ACE Psychological Examination for College Freshmen* and the *CEEB Scholastic Aptitude Test*, which have a high proportion of educational content. Part of the effect, however, was clearly due to practice, according to Frankel (1960). The same held for the *Miller Analogies Test* (Coladarci, 1960). French and Dear (1959) reported that the effects of various forms of coaching for such tests tended to be significant but slight. The importance of reducing the effects of speed was shown by Knapp (1960), who found that on the *Cattell Culture-Free Test* shorter time limits lowered performance of both native U.S. and Mexican subjects, having a greater effect on the latter.

Statistical and Experimental Analysis of Tests

In several studies, the practice was continued of reporting correlations among various tests such as the *Leiter International Performance Scale*, *Stanford-Binet Scale*, *SRA Primary Mental Abilities*, *Columbia Mental Maturity Scale*, and *Progressive Matrices*. Since, in almost all instances, the relationships were studied without reference to a systematic theoretical approach, little was contributed. Samples were usually small, and their size accounted for the frequently discrepant results; correlations were seldom high enough to permit substitution of one test for another (except when two tests with high educational loading were compared), and there was little value in knowing that a given correlation was .45 or .75.

The Wechsler scales continued to dominate the research literature. Littell (1960) provided a review of 10 years of research with the *WISC*, concluding that the test is useful but lacks validation.

Several factor analyses, with conflicting results, were reported. Cohen (1959) found essentially the same four factors at ages 7, 10, and 13: verbal knowledge, verbal comprehension, perceptual organization, and freedom from distraction. He found very little specificity for any subtest.

Maxwell (1959), using the same age groupings, reported two factors, verbal and spatial, at each age. Saunders (1959), however, obtained 10 unusual factors on the adult scale. Factor analysis continued to be a most frustrating scientific tool, as proponents of different mathematical models found results supporting their conflicting positions, even when they used the same data (Jackson, 1960).

More valuable findings on the Wechsler tests were yielded, in the reviewer's opinion, by studies like that of Murstein and Leipold (1961). They related performance on the *WAIS* digit symbol subtest to a separate measure of perceptual learning (a task that was very similar to the digit symbol test, but prevented the subject from looking back at the paired symbols) and to one of motor speed (a copying task). The results showed clearly that the digit symbol test is primarily a motor task for both fourth-graders and twelfth-graders, a finding that is consistent with its low inter-correlations with the other subtests. This finding, combined with the research on mazes reviewed by their major advocate, Porteus (1958), suggests that clinicians might exercise their option to substitute mazes for the digit symbol subtest in the *WISC*.

Interest in Wechsler pattern analysis seemed to be declining except with regard to reading retardation; in this area, fairly consistent results have been obtained, and Dockrell's (1960) attempt at theoretical explanation of these results seemed promising.

Interest in short forms of the Wechsler tests, obtained by selecting combinations of subtests, continued. Correlations in the .90's between three-test combinations and total score, as in the work of Clayton and Payne (1959), appeared to be the rule. The mentally retarded still appeared to provide an exception. Correlations were lower in Schwartz and Levitt's (1960) study.

New and Revised Tests

From a practical standpoint, the most important occurrence during the review period was probably the revision of the *Sanford-Binet Scale*, described by Terman and Merrill (1960). The principal changes were (a) incorporating into one form the most valid items (based on total score correlation) from the previous Form L and Form M, (b) adjusting the placement and scoring of items for changes in difficulty since 1937, (c) increasing the extent of behavior sampled within many items, and (d) changing to the deviation IQ. The manual is somewhat lacking in clarity. The authors may be forgiven for not restandardizing the new scale, but they should have presented more evidence that the scale provides distributions with means of 100 and standard deviation of 16 at each age level. Stratified samples of 100 each at ages 6 and 15 resulted in the expected standard-deviation values, but, in each case, a mean of 105 rather than 100. Further, neither of these groups was actually tested with the new form;

rather, scores were apparently derived from their performance on the Form L and Form M.

Two short tests of verbal ability were reported by Francesco (1960) and Borgatta and Corsini (1960), and a new performance test was reported by Kahn (1960). The *Peabody Picture Vocabulary Test* (Dunn and Hottel, 1961), the *Children's Picture Information Test* (Kogan and Crager, 1959), and the *North Central Individual Test of Mental Abilities* (French, 1959) were other new tests which had particular application to disabled children.

Recommendations

The reviewer would like to see the balance of research shift from inter-test correlation and simple predictive validity to refinement of tests based on correlations with more useful outside criteria.

For example, one would like to know which of the competing factor analyses of the Wechsler tests provides factor scores that will best predict such criteria as problem solving in the classroom and improvement with tutoring, or other criteria of theoretical or practical importance.

Bibliography

- AKUTAGAWA, DONALD, and BENOIT, E. PAUL. "The Effect of Age and Relative Brightness on Associative Learning in Children." *Child Development* 30: 229-38; June 1959.
- ANASTASI, ANNE. "Heredity, Environment, and the Question 'How?'" *Psychological Review* 65: 197-208; July 1958.
- BERKSON, GERSHON, and CANTOR, GORDON N. "A Study of Mediation in Mentally Retarded and Normal School Children." *Journal of Educational Psychology* 51: 82-86; April 1960.
- BORGATTA, EDGAR F., and CORSINI, RAYMOND J. "The Quick Word Test." *Journal of Educational Research* 54: 15-19; September 1960.
- BRADWAY, KATHERINE P.; THOMPSON, CLARE W.; and CRAVENS, RICHARD B. "Preschool IQs After Twenty-Five Years." *Journal of Educational Psychology* 49: 278-81; October 1958.
- BROEN, WILLIAM E., JR. "Anxiety, Intelligence, and Achievement." *Psychological Reports* 5: 701-704; December 1959.
- BURKE, HENRY R. "Raven's Progressive Matrices: A Review and Critical Evaluation." *Journal of Genetic Psychology* 93: 199-228; December 1958.
- BURT, CYRIL. "Intelligence and Social Mobility." *British Journal of Statistical Psychology* 14: 3-24; May 1961.
- CIEUTAT, VICTOR J., and CIEUTAT, LINDA G. "Meaningfulness(m), Verbal Ability, and Social Adjustment in Paired-Associate Learning." *Perceptual and Motor Skills* 12: 171-74; April 1961.
- CLAYTON, HUGH, and PAYNE, DAN. "Validation of Doppelt's WAIS Short Form with a Clinical Population." *Journal of Consulting Psychology* 23: 467; October 1959.
- CLINE, VICTOR B.; BEALS, ALAN R.; and SEIDMAN, DENNIS. "Experimenting with Accelerated Training Programs for Men of Various Intelligence Levels." *Educational and Psychological Measurement* 20: 723-35; Winter 1960.
- COHEN, JACOB. "The Factorial Structure of the WISC at Ages 7-6, 10-6, and 13-6." *Journal of Consulting Psychology* 23: 285-99; August 1959.
- COLAZARCI, ARTHUR P. "An Analysis of Miller Analogies Test Score Changes." *Educational and Psychological Measurement* 20: 817-23; Winter 1960.

- COLLMANN, R. D., and NEWLYN, D. "Changes in Terman-Merrill IQs of Mentally Retarded Children." *American Journal of Mental Deficiency* 63: 307-11; September 1958.
- DEIGNAN, FRANK J. "Two-Year Changes on the ACE by Students in a College of Art and Architecture." *Journal of Psychology* 47: 223-30; April 1959.
- DOCKRELL, W. B. "The Use of Wechsler Intelligence Scale for Children in the Diagnosis of Retarded Readers." *Alberta Journal of Educational Research* 6: 86-91; June 1960.
- DUNCAN, DONN R., and BARRETT, ALBERT M. "A Longitudinal Comparison of Intelligence Involving the Wechsler-Bellevue I and WAIS." *Journal of Clinical Psychology* 17: 318-19; July 1961.
- DUNN, LLOYD M., and HOTTEL, JOHN V. "Peabody Picture Vocabulary Test Performance of Trainable Mentally Retarded Children." *American Journal of Mental Deficiency* 65: 448-52; January 1961.
- EISMAN, BERNICE S. "Paired Associate Learning, Generalization and Retention as a Function of Intelligence." *American Journal of Mental Deficiency* 63: 481-89; November 1958.
- ELLIS, NORMAN R., and OTHERS. "Learning in Mentally Defective, Normal, and Superior Subjects." *American Journal of Mental Deficiency* 64: 725-34; January 1960.
- FISHER, JEROME. "The Twisted Pear and the Prediction of Behavior." *Journal of Consulting Psychology* 23: 400-405; October 1959.
- FRANCESCO, E. "The Verbal Power Test of Concept Equivalents (VPT)." *Journal of Psychology* 49: 213-16; April 1960.
- FRANKEL, EDWARD. "Effects of Growth, Practice, and Coaching on Scholastic Aptitude Test Scores." *Personnel and Guidance Journal* 38: 713-19; May 1960.
- FRENCH, JOHN W., and DEAR, ROBERT E. "Effect of Coaching on an Aptitude Test." *Educational and Psychological Measurement* 19: 319-30; Autumn 1959.
- FRENCH, JOSEPH L. "Intellectual Appraisal of Physically Handicapped Children." *Journal of Genetic Psychology* 94: 131-42; March 1959.
- GIRARDEAU, FREDERIC L. "The Formation of Discrimination Learning Sets in Mongoloid and Normal Children." *Journal of Comparative and Physiological Psychology* 52: 566-70; October 1959.
- HOLLAND, JOHN L. "The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Test." *Journal of Educational Psychology* 50: 135-42; August 1959.
- HURLEY, JOHN R. "Maternal Attitudes and Children's Intelligence." *Journal of Clinical Psychology* 15: 291-92; July 1959.
- JACKSON, M. A. "The Factor Analysis of the Wechsler Scale. I." *British Journal of Statistical Psychology* 13: 79-82; May 1960.
- JONES, W. R. "A Critical Study of Bilingualism and Non-Verbal Intelligence." *British Journal of Educational Psychology* 30: 71-77; February 1960.
- KAHN, THEODORE C. "Kahn Intelligence Tests: Experimental Form (Kit: EXP)." *Perceptual and Motor Skills* 10: 123-53; April 1960.
- KING, DONALD C., and BESCO, ROBERT O. "The Graduate Record Examination as a Selection Device for Graduate Research Fellows." *Educational and Psychological Measurement* 20: 853-58; Winter 1960.
- KLAUSMEIER, HERBERT J., and FELDHOUSE, JOHN F. "Retention in Arithmetic Among Children of Low, Average, and High Intelligence at 117 Months of Age." *Journal of Educational Psychology* 50: 88-92; April 1959.
- KLAUSMEIER, HERBERT J., and LOUGHLIN, LEO J. "Behaviors During Problem Solving Among Children of Low, Average, and High Intelligence." *Journal of Educational Psychology* 52: 148-52; June 1961.
- KNAPP, ROBERT T. "The Effects of Time Limits on the Intelligence Test Performance of Mexican and American Subjects." *Journal of Educational Psychology* 51: 14-20; February 1960.
- KNIEF, LOTUS M., and STROUP, JAMES B. "Intercorrelations Among Various Intelligence, Achievement, and Social Class Scores." *Journal of Educational Psychology* 50: 117-20; June 1959.
- KOGAN, KATE L., and CRAGER, RICHARD L. "Standardization of the Children's Picture Information Test." *Journal of Clinical Psychology* 15: 405-11; October 1959.
- LAW, ALEXANDER. "The Prediction of Ratings of Students in a Doctoral Training Program." *Educational and Psychological Measurement* 20: 847-51; Winter 1960.

- LEVINSON, BORIS M. "A Comparison of the Performance of Bilingual and Monolingual Native Born Jewish Preschool Children of Traditional Parentage on Four Intelligence Tests." *Journal of Clinical Psychology* 15: 74-76; January 1959.
- LEVINSON, BORIS M. "Subcultural Variations in Verbal and Performance Ability at the Elementary School Level." *Journal of Genetic Psychology* 97: 149-60; September 1960.
- LITTELL, WILLIAM M. "The Wechsler Intelligence Scale for Children: Review of a Decade of Research." *Psychological Bulletin* 57: 132-56; March 1960.
- MASLING, JOSEPH. "The Effects of Warm and Cold Interaction on the Administration and Scoring of an Intelligence Test." *Journal of Consulting Psychology* 23: 336-41; August 1959.
- MAXWELL, A. E. "A Factor Analysis of the Wechsler Intelligence Scale for Children." *British Journal of Educational Psychology* 29: 237-41; November 1959.
- MICHAEL, WILLIAM B.; JONES, ROBERT A.; and GIBBONS, BILLIE D. "The Prediction of Success in Graduate Work in Chemistry from Scores on the Graduate Record Examination." *Educational and Psychological Measurement* 20: 859-61; Winter 1960.
- MURSTEIN, BERNARD I., and LEIPOLD, WILLIAM D. "The Role of Learning and Motor Abilities in the Wechsler-Bellevue Digit Symbol Subtest." *Educational and Psychological Measurement* 21: 103-12; Spring 1961.
- NICHOLS, ROBERT C. "The Effect of Ego Involvement and Success Experience on Intelligence Test Results." *Journal of Consulting Psychology* 23: 92; February 1959.
- NISBET, JOHN, and BUCHAN, JIM. "The Long-Term Follow-Up of Assessments at Age Eleven." *British Journal of Educational Psychology* 29: 1-8; February 1959.
- NOBLE, CLYDE E.; NOBLE, JANET L.; and ALCOCK, WAYNE T. "Prediction of Individual Differences in Human Trial-and-Error Learning." *Perceptual and Motor Skills* 8: 151-72; September 1958.
- NOLL, VICTOR H. "Relation of Scores on Davis-Eells Games to Socio-Economic Status, Intelligence Test Results, and School Achievement." *Educational and Psychological Measurement* 20: 119-29; Spring 1960.
- O'CONNOR, N., and HERMELIN, B. "Discrimination and Reversal Learning in Imbeciles." *Journal of Abnormal and Social Psychology* 59: 409-13; November 1959.
- PALLONE, NATHANIEL J. "Effects of Short- and Long-Term Developmental Reading Courses upon S.A.T. Verbal Scores." *Personnel and Guidance Journal* 39: 654-57; April 1961.
- PLANT, WALTER T., and LYND, CELIA. "A Validity Study and a College Freshman Norm Group for the Wechsler Adult Intelligence Scale." *Personnel and Guidance Journal* 37: 578-80; April 1959.
- PORTEUS, S. D. "What Do the Maze Tests Measure?" *Australian Journal of Psychology* 10: 245-56; December 1958.
- SAUNDERS, DAVID R. "On the Dimensionality of the WAIS Battery for Two Groups of Normal Males." *Psychological Reports* 5: 529-41; September 1959.
- SCHWARTZ, LEWIS, and LEVITT, EUGENE E. "Short-Forms of the Wechsler Intelligence Scale for Children in the Educable, Noninstitutionalized, Mentally Retarded." *Journal of Educational Psychology* 51: 187-90; August 1960.
- SHARP, HEBER C. "A Note on the Reliability of the Leiter International Performance Scale, 1948 Revision." *Journal of Consulting Psychology* 22: 320; August 1958.
- SHUFY, AUDREY M. *The Testing of Negro Intelligence*. Lynchburg, Va.: J. P. Bell Co., 1958. 351 p.
- STOTT, D. H. "Observations on Retest Discrepancy in Mentally Sub-Normal Children." *British Journal of Educational Psychology* 30: 211-19; November 1960.
- TERMAN, LEWIS M., and MERRILL, MAUD A. *Stanford-Binet Intelligence Scale*. Boston: Houghton Mifflin Co., 1960. 363 p.
- WALLEN, NORMAN E. "A Group Test of Auditory Discrimination Learning and Some Correlates with Intellectual Performance." *Journal of Psychology* 48: 263-70; October 1959.
- WALTERS, RICHARD H. "The Intelligence Test Performance of Maori Children: A Cross-Cultural Study." *Journal of Abnormal and Social Psychology* 57: 107-14; July 1958.
- WARREN, PHYLLIS A. "A Mental Maturity Test as One Criterion for Admission to an American School Abroad." *Personnel and Guidance Journal* 39: 197-202; November 1960.

CHAPTER III

Development and Application of Tests of Special Aptitude

JOHN E. MILHOLLAND and BENNO C. FRICKE

THERE HAS been little published research on the development and application of tests of special aptitude. Apparently, much of it is not published in the regular channels, since it may be relevant only to the particular setting in which it is carried out, and is circulated only to the persons most directly concerned. Some of the work done in research facilities in the armed forces, in industry, and in school systems, colleges, and universities may be of this nature. Also, many research reports that, in former years, would have been published in journals are printed privately and circulated to persons most likely to be interested in them. Examples are Guilford's reports from the Psychological Laboratory of the University of Southern California, reports by Paul Horst at the University of Washington, and the Educational Testing Service research bulletins. Perhaps the time lag and constricted space allocations of journals are causing them to lose their role as a primary means of communication among scholars.

In considering whether to note a particular bit of research in this chapter, it was necessary to define aptitudes and aptitude tests. Relatively little attention has been given recently to the a priori nature of aptitudes. Empiricism has been dominant, and it is said that a person has high aptitude for performance X if he does well on a test that predicts X. The same test may be called an achievement test in one setting and an aptitude test in another.

The distinction between aptitude and achievement tests probably has broken down because achievement tests have been found to provide generally better predictions of future achievement than have aptitude tests. Herein lies a major problem. Immediate practical pressures have brought about an overemphasis on predictive accuracy for a rather restricted range of situations at the expense of assessment of educationally and psychologically important traits that would provide information of more general utility. Super (1956) has discussed this point in a plea for "multipotentiality."

There is some profit in distinguishing between aptitudes and abilities, and between aptitude tests and achievement tests. Twenty-five years ago, Bingham (1937) defined aptitude as an index of fitness to acquire proficiency in a pursuit and to engage in it with satisfaction. He would include interest, therefore, as a facet of aptitude. From the standpoint of test construction, interest would not be included because it is considered desirable to maintain the separation between "maximum" performance

and "typical" performance. A measure of aptitude should tell to what extent a person can develop the ability to perform tasks. It should not be contaminated by the content of the ability, even though this would improve prediction. This kind of definition leads also to a distinction between aptitude and achievement tests. The merit of having aptitude tests that truly test aptitude and achievement tests that truly test achievement is that certain inferences can be drawn which are important in the guidance, education, and selection of students.

Scores from tests such as the *American Council on Education Psychological Examination* tests (aptitude tests) and the Cooperative tests in English, mathematics, and chemistry (achievement tests) were individually and jointly very valuable. These tests have largely been replaced by the *School and College Ability Tests* and the *Sequential Tests of Educational Progress*, which are general-ability tests. It would be pointless to attempt to conclude anything about overachievement or underachievement from the latter two tests; both of these measure both aptitude and achievement. Sometimes a test-user cannot conclude from the test scores available whether a student has a great deal of aptitude but has achieved very poorly or has very limited aptitude but has achieved a great deal; both types of students would obtain about average scores on the ability tests.

This brings us to perhaps the most damaging criticism that can be made of aptitude tests and aptitude-test research. There is a paucity of evidence to demonstrate that distinguishably different aptitudes are being measured. The high regard that laymen, and most educators and psychologists, have for aptitude testing is mostly due to the *general validity* of the tests. More specifically, there are many studies which show that a measure of linguistic aptitude predicts grades in English, foreign languages, and social studies hardly better than it predicts grades in mathematics and science. Similarly, numerical-aptitude tests often do not predict mathematics and science grades more accurately than they predict English, foreign language, and social-studies grades.

The excellent paper by Campbell and Fiske (1959) on a "multitrait-multimethod" model for evaluating the trait or construct validity primarily of personality and interest variables or measures contains many suggestions applicable to the aptitude domain. This article makes a most significant methodological contribution to education and psychological assessment. However, the authors do not involve really different methods, and unless methods are basically different, erroneous conclusions similar to Type II errors in statistical inference may be reached.

The Campbell and Fiske model would be useful in establishing whether certain specific aptitudes and the tests designed to measure them do in fact differ from other aptitudes and their respective tests. The demanding but reasonable standards they outline provide some protection against the proliferation of presumably measurable and different "aptitudes." It seems likely that many tests that have been used with confidence for many years would fail to survive their first real trial.

• The search for studies completed during the three-year period did not produce one investigation where even a rough evaluation of construct validity of aptitude tests might be made. Part of the problem can undoubtedly be traced to the current preoccupation with predictive validity, but part also may be attributed to publication policies of journals. Editors seem not to favor printing correlation matrices containing more than a few variables. Consequently, it is not possible to learn, for example, whether grades in art are predicted more accurately by a "space relations" aptitude test than by a "word fluency" aptitude test.

.. Multiscore Tests

A variety of studies have used multiscore tests, but usually no more than one criterion was involved—over-all academic success. Research before and during the period under review has shown conclusively that for most such criterion-prediction problems, it rarely is necessary to employ more than a single general-aptitude measure.

Differential Aptitude Tests

In published research, the most favored multiscore instrument is the *Differential Aptitude Tests (DAT)*. Layton and Swanson (1958) found that the *DAT* Verbal Reasoning subtest provided the best prediction of grades. Use of the *DAT* Verbal Reasoning subtest with the *DAT* Numerical Ability subtest produced a multiple-correlation coefficient of .63. They also reported for these two predictor variables, which were obtained in the ninth grade, the correlations with two test criteria, the *College Entrance Examination Board Scholastic Aptitude Test* and the *Cooperative English Test*, obtained in the eleventh grade. As one would expect, the multiple correlations were higher, .69 and .70, respectively. A study by Rosinski (1960) stated that all tests must not necessarily be multifactor batteries, on the basis of a multiple correlation of .82 between just *DAT* Verbal Reasoning and Abstract Reasoning scores obtained in the tenth grade and Otis IQ's obtained in the twelfth grade.

The similarity of the *DAT* to a new, short, eight-score test was investigated by Merenda (1961). He compared the validity coefficients (actually multiple correlations) of the *DAT* with those of the *Measurement of Skills (MOS)* test for predicting grades in tenth-grade English, mathematics, and science. The multiple correlations for both tests were surprisingly low, averaging about .44 for boys and .55 for girls. The results of Merenda's study cannot be accepted as an indication of the relative efficiency of the two tests for the following reasons: First, there were no cross-validations. Second, the two tests were administered at different times, the *DAT* in the eighth grade and the *MOS* in the eleventh grade. Third, the *DAT* provided two-year predictive results; the *MOS*, one-year postdictive results. And, fourth, the same subjects were not used for both tests.

A much more elaborate series of studies involving the *DAT* at the college level was reported by Smith (1958a, b, 1959). The last report included three *DAT* subtests, the *Nelson-Denny Reading Test*, and several personality and interest inventories. A factor analysis yielded eight factors, which were interpreted. *DAT* Numerical Ability, Verbal Reasoning, and Abstract Reasoning subtests did not have the highest loading on any of the factors, but there were appreciable loadings on four that Smith labeled verbal ability, scientific creativity, self-confidence, and objective observer *versus* subjective observer. He concluded that measured abilities are merely limited aspects of more basic dimensions of personality. From the raw scores and factor loadings he obtained "derived factor scores" for each subject. These "trait" scores were related to two criteria: (a) grade-point average and (b) enrollment in one of three curriculums—arts, commerce, or science. About one-half of the factor scores were significantly related to each criterion. Smith did not compare his method with typical procedures, so it is not possible to be certain whether the use of derived factor scores is advantageous. More valid prediction and separation would appear to result from simply selecting the most pertinent original tests and scales. For example, Smith's verbal-ability trait-factor scores had validity coefficients of only .20, .27, .12, and .21 for the grade-point-average criterion for students in arts, commerce, and science and for the total of the students, respectively. Single test validities higher than this are not uncommon.

SRA Primary Mental Abilities

Several studies employed the *SRA Primary Mental Abilities (PMA)* tests. Three articles on two sets of subjects produced confusing conclusions on mental development in children. Tyler (1958) administered the *PMA* to 83 fourth-graders who had taken it three years earlier and to 127 eighth-graders who had taken it four years earlier. The median test-retest reliability for the younger group was .49; for the older group, .63. However, Tyler reported that a correlational analysis indicated that the total score, representing general intellectual level, can be used to predict later scores on individual primary abilities about as accurately as later scores can be predicted from previous scores on the same primary abilities. The median differences were .01 for the younger group and .02 for the older group. The above results were perceived as "again suggesting increasing stability of individual mental-ability patterns as age progresses" (p. 774).

Meyer (1960) reported a study in which the *PMA* was given to 100 eleventh-graders who had taken it three years earlier. The median test-retest reliability was .73, but Meyer found that a prior measure of ability predicted subsequent performance on that ability somewhat better than the total score. The median difference was .10. Meyer agreed with Tyler that there was "increasing differentiation of the primary abilities with age" (p. 800). An article by Meyer and Bendig (1961), however, includes the following statement: "The absence of evidence for increased dif-

differentiation of abilities as noted from grade 8 to grade 11 and the highly correlated second-order factor were viewed as support for Vernon's hierarchical-structure theory of intelligence" (p. 59). Although this conclusion differs from that reached in the earlier article by the senior author (Meyer, 1960), the differences are not reconciled. Further, it appears that the original data on which the two reports were based either were the same, or the same subjects were used.

Racky (1959) presented results for five *PMA* tests, the seven subtests of the *MacQuarrie Test for Mechanical Ability*, three *SRA Mechanical Aptitudes* subtests, and several other ability, personality, and interest measures for pupils in ninth-grade woodshop. The entire 38-variable correlation matrix for 215 boys is presented. Included as criteria are a project grade and a final semester grade. The validity coefficients for the two criteria were almost identical. Almost all of the 15 aptitude subtests correlated significantly with the criteria, but none was above .38 (the Location subtest of the *MacQuarrie*). Much better predictions were provided by a rating scale of personality traits (.59) and a personal-data questionnaire (.52). Various combinations of the 15 tests did not produce multiple-correlation coefficients as high as the personality measures. The best combination of predictors included *Kuhlman-Anderson Intelligence Tests* scores, *Kuder Preference Record* mechanical-interest scores, *MacQuarrie Test for Mechanical Ability* scores, chronological age, and a score on a questionnaire about home and extracurricular influences. The regression equation was developed in one Chicago high school and cross-validated in two others. The multiple correlation for the original school was .69; for the two other schools, .60 and .62. The author of this excellent study seems thoroughly justified in his conclusion that predictions on the basis of the battery may be used for identifying students who may need special help. He explicitly cautions against rigid selection or elimination.

The *PMA* also was involved in another study of success in nonacademic courses, and the results were somewhat more favorable for the aptitude measure. Kaczowski and Connery (1958) related five *PMA* scores of 500 pupils to average grade in three semesters of workshop. The validity coefficients were highest for Space and Reasoning subtests and lowest for the Verbal Meaning and Word Fluency subtests and provide some evidence for construct validity for the *PMA* tests.

Other Multiscore Tests

Ruch and Ruch (1960) presented validity results for a new multiscore test, the *Employee Aptitude Survey*. Their sample consisted of 37 draftsmen in a training program. The criterion was instructors' ratings of "total technical proficiency." Almost all of the subtests had significant validity coefficients. The total impression of the results is quite unfavorable because the best predictor proved to be the Verbal Reasoning subtest (.63). The Space Visualization subtest had the second lowest validity (.36).

Michael, Stewart, and Rainwater (1959) reported on the development of a *Career Test Battery* of seven subtests to be used by the Los Angeles County Civil Service Commission in screening job applicants. Results for job applicants are not given. The authors presented factor-analysis results for two samples of Marine Corps recruits. Those having above-average total *Army General Classification Test* scores were analyzed separately from those having below-average scores. Each analysis produced 11 factors, but results for only 7 are given in the article. In general, the tests load most highly on the appropriate factor, but no evidence on the empirical validity of the tests or factors is available. This study shows again that it is possible to identify and measure factors in the test-taking behavior of subjects, but the important step of establishing the relation of these factors to the non-test-taking behavior of the subjects is not taken.

D'Amico, Bryant, and Prael (1959) administered the *Multiple Aptitude Tests* to a heterogeneous sample of 450 junior-college students and correlated scores from the nine tests with grades in 12 course areas. The validity coefficients are not likely to be representative because of small sample size ($N=33$) in 7 of the areas. The tests tended to predict pertinent criteria somewhat better than they predicted grades in other areas. Unfortunately there are many exceptions, and the basing of the various correlations on different sets of students precluded comparisons of the predictive validities of the subtests.

Schutz (1958) reported correlational and factorial results for the *Holinger-Crowder Uni-Factor Tests*, based on 2562 tenth-grade students involved in the national standardization program. The results support claims that the nine tests measure four factors.

A study by Sharp and Pickett (1959) of *General Aptitude Test Battery (GATB)* scores by 262 upper-division students at Utah State University was routine in nature, and their report lacked completeness. All but two of the nine scores correlated at the 1-percent level with over-all grade-point average; the Verbal Aptitude subtest had the highest validity, .46. When only the 47 engineering students were involved, two scores, Intelligence (.44) and Verbal Aptitude (.40), had validities significant at the 1-percent level. The Numerical Aptitude score correlated .27, not significant at the 5-percent level. Unreported data for the students in business administration, education, and physical education made it impossible to evaluate differential validity. In comparison with the total group, the engineers obtained somewhat higher Intelligence and Spatial Aptitude scores and somewhat lower Motor Coordination scores.

Droege (1960), in an article misleadingly entitled "G. A. T. B. Norms for Lower High School Grades," presented a summary of validity, reliability, and normative studies, most of which were reported in a volume published by the U.S. Department of Labor (1958), others of which are currently under way. The major point of the article is that follow-up studies have disclosed *GATB* score points at the ninth-grade and tenth-grade levels equivalent to the twelfth-grade scores that are normally used

to identify appropriate "occupational aptitude patterns." The actual ninth-grade and tenth-grade norms, however, are not provided. According to the summary of validity studies, each of the nine *GATB* scores is rather strongly related to high-school grades. Although the poorest predictors (i.e., Manual Dexterity and Spatial Aptitude scores) tend to be the right ones, the best predictors in this study were Clerical Perception and Numerical Aptitude scores, both of which correlated .56.

Most of the leading multiscore tests have issued new manuals and accessory material, although very little new information of consequence is contained in them. An exception is the 61-page *Flanagan Aptitude Classification Tests: Technical Report* (Flanagan, 1959a), which contains a great deal of valuable data not previously available. Of special interest are the results of five-year follow-up studies.

Special-Aptitude Tests

In this section, new tests and investigations dealing with narrowly defined aptitudes are cited, as well as studies in which the criteria are broader than the term "special aptitudes" would warrant.

Perceptual-Motor Tests

Several general perceptual-motor studies were reported. In a factor analysis of dexterity tests, Bourassa and Guion (1959) found neither a "tweezer dexterity" factor, which they thought might appear, nor a "finger dexterity" factor previously found with some of the same tests they used. They ascribed their results to the following causes: (a) The varied order of presentation of the tests limited correlation generated by subjects' set, and (b) the visual tests combined with what might have been finger and/or tweezer dexterity factors to form a "visual feedback" factor. This study points to the necessity for careful procedures and thorough coverage of a domain by the factor-analysis battery. Recent factor-analytic theory has emphasized the many influences being sought, other than dimensions of behavior, which affect the outcome of an analysis.

Drewes (1961) developed some "synthetic" dexterity tests based on motion analysis of a job, the output of which was used as the criterion for the set of tests. He demonstrated the utility of his procedure by obtaining higher validities when the tests corresponded to the jobs than when they did not correspond. Two oddities in the report of the study are disconcerting: His tables are arranged in such a way as to produce negative phi coefficients, and he apparently computed his phi coefficients directly from the chi squares used in testing for significance, without first removing the continuity correction. Thus a phi coefficient that he reports as .563 is really .625.

A factor analysis of three perceptual tests, three motor-speed tests, age, education, and *Wechsler Adult Intelligence Scale Vocabulary Test*

was performed by Clark and King (1960) on a casual sample of 199 persons applying for renewal of driving licenses. They concluded that, primarily because of the wide range of ages in their sample, only two factors, motor speed and perceptual speed, accounted for 78 percent of the common variance of the tests. Education and vocabulary had high loadings on perceptual speed and low loadings on motor speed.

Other Special-Aptitude Tests

The development of a test to cover five areas of visual perception for children aged three and a half to eight years was reported by Frostig, Lefever, and Whittlesey (1961). Validity was assessed by differentiation among various age groups of children and between normal and neurologically handicapped children. Attention should be called to the basing of the reported reliabilities (.98 for total score; mean of .80 for the subtest) on the entire age range. The authors are continuing work on the test.

Goldstein and Brooks (1960) adapted a red-green color vision test for group presentation by the use of transparencies and a projector. Correspondence with the original test (Hardy, Rand, and Rittler, 1957) was good. Such correspondence is welcome if it means that testing for deficient color vision will become more widespread in schools.

Krumboltz and Christal (1960) used two forms of the *Air Force Instrument Comprehension Test* and two forms of the *Flight Orientation Test* in a study of practice effect. They compared retests using the same test, same form; with the same test, different form; and with different tests. They found no difference between the first two situations; moreover, there was no difference between different tests, even though they were supposed to have the same factor structure. Their longest retest interval was seven hours, and they observed no diminution of practice effect within that span.

Flanagan's (1959b) *Tapping Test*, which measures speed and accuracy of tapping with appropriate fingers, was designed to predict performance in typing. Felt pads inked with different colors are worn on the fingers, and the testee makes marks in a set of circles according to coded directions.

A new test of foreign language aptitude by Carroll and Sapon (1959) contained two listening sections and three other parts. The parts were designed to correspond to factors obtained in an analysis reported by Carroll (1958). The entire test may be administered by tape recorder or in a short form, omitting the listening sections, by an examiner.

Two efforts at identifying scientific talent leave much to be desired. Morgan (1959) used her *Test of Logical Reasoning* with high-school seniors in the national Science Talent Search for the Westinghouse Science Scholarships and found they did better than control groups. Since little information exists on the effectiveness of other measuring instruments, her finding hardly justifies the use of the test.

Edgerton (1959) recommended a list of scientific activities and a science-vocabulary test to identify an upper one-third of sixth-graders and seventh-graders to whom "encouragement should be given." There was no follow-up validation. It would appear desirable that "encouragement" be given also to pupils in the lower two-thirds of the score range. Early scientific attainments are, to be sure, predictive of later accomplishment, but not enough is yet known about how and when career choices are made to justify any limitation of scientific opportunity for these pupils.

A somewhat more general set of "special abilities" was investigated by Kettner, Guilford, and Christensen (1959). They factor-analyzed a battery of 57 tests of reasoning, creativity, and evaluation in an attempt to clarify, verify, and improve tests of factors previously obtained. Nine of the eleven former factors appeared, two did not; and five new factors were found. This study is a rare and welcome attempt to define and measure more clearly some dimensions of ability that have been identified previously.

Assessment and Prediction of Success in Professional Schools

Useful studies of the selection of students for medical school continued to be published. Klinger and Gee (1960) presented a variety of data in conjunction with *Medical College Admission Test (MCAT)* scores of applicants. Despite a decline in recent years in the percent of college students who become applicants for medical school, the author's tables showed an amazing stability in tested aptitude. The average score of accepted applicants on each of the four parts of the *MCAT* has been almost exactly 525 for the past seven years. The authors pointed out that this stability was largely due to the greater weight given to the test scores in the selection process.

Schumacher and Gee (1961), after finding that approximately 4 percent of the applicants in their study took the *MCAT* at least twice, investigated the relationship between initial and retest scores. The usual correlation coefficient was not reported, but actual score changes, which are more meaningful to users of the *MCAT*, were interpreted. The average gain on each test ranged from 17 for Modern Society (MS) to 42 for Science Achievement (SA); the gains on Verbal Ability (VA) and Quantitative Ability (QA) averaged about 23 points. The over-all gain was thus about one-quarter of a standard deviation. In discussing score changes of students at different levels of initial performance, the authors cited a gain of 53 points on SA (as opposed to 8 points on VA and QA) made by examinees initially high (above 500) on VA and QA, as evidence that VA and QA were measures of "scholastic potential." This conclusion seems unwarranted on this basis, however, since the initial mean for the group on VA and QA was 572; for SA it was 492, and, thus, differential statistical regression might have played a large part in these differential gains.

Hubbard and Clemans (1960) reported results on the relation of the *MCAT* scores to scores from the *National Board of Medical Examiners*

Tests (NBMET). The latter are objective achievement tests that were designed to assess knowledge and other outcomes of the medical program; the total score on Part II correlated about .69 with four-year grade averages in medical school. An interesting item bearing on the "evaluation value" of tests was cited. A "highly selective" school, whose students averaged 600 on the SA subtest of the *MCAT*, obtained about average scores on the *NBMET*; almost the same *NBMET* scores were obtained by the students of a "small state university school," whose students averaged about 483 on SA.

Little, Gee, and Novick (1960) divided 14 medical schools into two groups on the basis of the progress their students made toward graduation. The groups differed on the *MCAT*, but differences within the groups were not consistent. Crowder (1959) found that neither the scores on the four parts of the *MCAT* nor the total *MCAT* score predicted first-year grades in the Medical College of Georgia as well as undergraduate grades did. The Science subtest (.39) and science grades (.47) both provided somewhat better predictions than the totals of which they were a part.

Accounting is another of the few professional areas which has attracted the interest of researchers over a period of years. North (1958) described aptitude and achievement tests used for guidance and selection in accounting. He reviewed most of the studies completed during the past 10 years and pointed out some of the problems involved in demonstrating the validity of the tests. Evidence from diverse sources led him to conclude that the *Orientation Test*, designed to measure aptitude for accounting by assessing verbal and quantitative skills in the context of business, was somewhat more valid as a predictor of success than the usual scholastic-aptitude and intelligence tests. He referred to studies that showed that aptitude for accounting tests usually correlated below .70 with these latter tests, which usually correlate above .70 with each other. North's report suggests that test construction and research efforts in this area are certainly moving in the right direction. The *Achievement Test* assesses "knowledge of the principles and procedures of accounting," but the *Orientation Test* apparently does not, since care was taken to avoid any items "which subsume formal course instruction in bookkeeping, accounting, or the general area of business." Traxler (1959) presented results from several specific validity studies. Criteria involved were course grades, performance on certified-public-accountancy examinations, supervisory ratings, and salary increases.

The validity of law-school selection variables was the concern of Ramsey (1960, 1961). He found that the *Law School Admission Test* had somewhat lower predictive power than undergraduate grades at Harvard and Yale.

A study of success in nursing was reported by Haney, Michael, and Jones (1959). Their research included a factor analysis of more than average interest and value, since several criteria as well as predictor variables were used. The 14 subtests were drawn from many different multiscore tests, but no explanation was given for the particular choices made. Some of the aptitude and achievement tests selected do not seem highly ap-

appropriate for identifying predictive factors in the four criteria of success in nursing training. Probably because of this, most of the eight factors extracted from the 18-variable analyses had negligible loadings on the four criteria. Perhaps this also is the reason that one of the eight factors loaded substantially on all criteria, but did not load on any of the predictors. The authors presented the validity coefficients of the 14 predictors for the four criteria in the same table that contained the factor loadings. This very desirable feature of their report should become standard research practice. One of the surprising results they obtained was a high negative correlation between the *Survey of Object Visualization* and the anatomy-grade criterion. These two variables had the highest loading on a factor they labeled "speed of manipulation of visually portrayed objects." Whether this factor and associated validity are real depends on the results of a cross-validation study.

One important point in the interpretation of validity coefficients, though most pertinent to the use of aptitude tests for the selection of students for professional schools, also applies to the evaluation of all assessment and prediction variables. In most situations, where either self-selection and/or selections by others has taken place, it is difficult to evaluate the basic validity of a device by means of correlation coefficients. It is practically nonsense to conclude on the basis of the typical correlational study that, for example, the *Law School Admission Test* is inferior (or superior) to undergraduate grades for the purpose of selecting students, since both variables have been used in the selection process. Nor will the usual corrections for restriction of range restore the lost meaning to the coefficients. The variable with the highest validity coefficient may not be the best indicator of quality—it may merely be the variable that happened to receive the least weight in the selection process.

This phenomenon is explained in part by the fact that if individuals very low on one variable are selected when they are very high on a second and perform well, the validity coefficient for the first variable is attenuated, and vice versa. Whenever there is a conflict between two selection variables, and the applicant is admitted, one of the variables will have its validity reduced regardless of how the individual performs. If there is inconsistent use of the predictors in selection, there may be considerable heterogeneity on all variables—each one of them could have a low validity coefficient.

Prediction from Batteries

Past experience has indicated that, in many situations, optimum weighting of multiple predictors can be approximated without much detriment to predictive efficiency. Studies by Forehand and McQuitty (1959), Lawshe and Schucker (1959), and Eells (1961), involving different weighting systems, multiple-regression equations, or configural scoring, indicated that complicated techniques are but little better than simple ones.

Dunn (1959), in a study using discriminant functions and multiple-regression equations, came to the sweeping conclusion: "Results suggest that the use of regression analysis for guidance in choice problems is questionable." Before relegating regression equations to limbo, however, it should be noted that the problem attacked was choice of academic major, for which a discriminant function was developed. A multiple-regression equation was developed to predict grade-point average. Furthermore, the multiple correlations in the experimental group ranged from .416 to .914 in five major fields, but in the cross-validation group the range was from -.433 to .160. Since the sample sizes were large (455 to 925), some unusual factors were operating to cause such a radical shift of predictability. Dunn provided a good discussion of the point that the major chosen may not always lie in the field with highest predicted success, and perhaps this study should be regarded as a verification of that hypothesis, rather than as a comparison of the utility of discriminant functions and multiple-regression equations.

In another study of college major fields, French (1961) related some aptitude and interest variables to satisfaction with college major, as reported by college seniors. The test data were collected when the students were freshmen. Dunn's finding that majors apparently are not chosen on the basis of the possibility of obtaining high grades is complemented by French's correlations of .02, .07, and .09 between grades in the major field and ratings of satisfaction in it made by science, humanities, and social-science majors. In addition, he found that, although students in each field had an appropriate pattern of average aptitude-test scores, satisfaction with the major field was not predictable from score patterns. There was, however, a consistent trend for interest patterns to predict satisfaction.

Turning to conventional prediction studies, Calia (1960) used a discriminant function based on aptitude, interest, and personality variables to predict whether students at Boston University Junior College would fail out, become terminal students, or become eligible for transfer to the senior division. About 67 percent of a cross-validation group were correctly classified, compared with 40 percent so classified if everyone were assigned to the most numerous category.

Thorndike and Hagen's (1959) monumental study cannot, of course, be adequately treated in the space allotted here. Follow-up data on 17,000 men who were tested upon entry into aviation cadet training in 1943 were collected in 1955-56, 12 years later. The test battery consisted of 20 measures, some of which were based on biographical data. In general, occupational groups were differentiated well on the basis of average test and battery scores, but within groups variability was great. In view of the time span involved, profiles of mean scores differentiated the subjects by occupation amazingly effectively; the authors were a little too modest about the accomplishments of the predictor battery: Attempts to correlate predictor measures with measures of success within an occupation did not yield

much. In the first place, the authors experienced the usual inability to obtain satisfactory criteria of success; and secondly, even if good criteria had been used, the influence of selective factors (by self and others), both in the original sample and in subsequent history, would have made correlation coefficients almost impossible to interpret. The book contained a wealth of detail for specific occupational groups, which could be of some use in counseling if interpreted in light of the limitations imposed by the nature of the sample and the conditions prevailing at the time the data were collected. Considering the diversity of activities that come under the same job title in various sections of the country and the pace of change in our occupational patterns between 1943 and 1955, it seems to be symptomatic of a fairly healthy state of the science of aptitude testing that Thorndike and Hagen can say: "When it comes to differences between groups, our results show that they were real, sometimes substantial, and, in most cases, sensible" (p. 49).

Bibliography

- BINCHAM, WALTER V. D. *Aptitudes and Aptitude Testing*. New York: Harper & Brothers, 1937. 390 p.
- BOURASSA, G. LEE, and GUION, ROBERT M. "A Factorial Study of Dexterity Tests." *Journal of Applied Psychology* 43: 199-204; June 1959.
- CALIA, VINCENT F. "The Use of Discriminant Analysis in the Prediction of Scholastic Performance." *Personnel and Guidance Journal* 39: 184-90; November 1960.
- CAMPBELL, DONALD T., and FISKE, DONALD W. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* 56: 81-105; March 1959.
- CARROLL, JOHN B. "A Factor Analysis of Two Foreign Language Aptitude Batteries." *Journal of General Psychology* 59: 3-19; July 1958.
- CARROLL, JOHN B., and SAPON, STANLEY M. *Modern Language Aptitude Test*. New York: Psychological Corporation, 1959.
- CLARK, JAMES A., and KING, GERALD F. "Perceptual and Motor Speed in an Extended Age Group: A Factor Analysis." *Perceptual and Motor Skills* 11: 99-102; October 1960.
- CROWDER, DOLORES G. "Prediction of First-Year Grades in a Medical College." *Educational and Psychological Measurement* 19: 637-39; Winter 1959.
- D'AMICO, LOUIS A.; BRYANT, J. HOWARD; and PRAHL, MARIE R. "The Relationship Between MAT Scores and Achievement in Junior College Subjects." *Educational and Psychological Measurement* 19: 611-16; Winter 1959.
- DREWES, DONALD W. "Development and Validation of Synthetic Dexterity Tests Based on Elemental Motion Analysis." *Journal of Applied Psychology* 45: 179-85; June 1961.
- DROEGE, ROBERT C. "G.A.T.B. Norms for Lower High School Grades." *Personnel and Guidance Journal* 39: 30-35; September 1960.
- DUNN, FRANCES E. "Two Methods for Predicting the Selection of a College Major." *Journal of Counseling Psychology* 6: 15-26; Spring 1959.
- EDGERTON, HAROLD A. "Two Tests for Early Identification of Scientific Ability." *Educational and Psychological Measurement* 19: 299-304; Autumn 1959.
- ELLIS, KENNETH. "How Effective Is Differential Prediction in Three Types of College Curricula?" *Educational and Psychological Measurement* 21: 459-71; Summer 1961.
- FLANAGAN, JOHN C. *Flanagan Aptitude Classification Tests: Technical Report*. Chicago: Science Research Associates, 1959. 61 p. (a)
- FLANAGAN, JOHN C. *The Tapping Test*. Pittsburgh: Psychometric Techniques Associates, 1959. (b)

- FOREHAND, G. A., JR., and MCQUITTY, LOUIS L. "Configurations of Factor Standings as Predictors of Educational Achievement." *Educational and Psychological Measurement* 19: 31-43; Spring 1959.
- FRENCH, JOHN W. "Aptitude and Interest Score Patterns Related to Satisfaction with College Major Field." *Educational and Psychological Measurement* 21: 287-94; Summer 1961.
- FROSTIG, MARIANNE; LEFEVER, D. WELTY; and WHITTLESEY, JOHN R. B. "A Developmental Test of Visual Perception for Evaluating Normal and Neurologically Handicapped Children." *Perceptual and Motor Skills* 12: 383-94; June 1961.
- GOLDSTEIN, ALVIN G., and BROOKS, RICHARD. "A Red-Green Color Vision Test Employing Transparencies." *Perceptual and Motor Skills* 11: 229-30; October 1960.
- HANEY, RUSSELL; MICHAEL, WILLIAM B.; and JONES, ROBERT A. "Identification of Aptitude and Achievement Factors in the Prediction of the Success of Nursing Trainees." *Educational and Psychological Measurement* 19: 645-47; Winter 1959.
- HARDY, L. H.; RAND, G.; and RITTNER, M. C. *AO H-R-R Pseudoisochromatic Plates*. Second edition. Southbridge, Mass.: American Optical Co., 1957. 24 plates.
- HUBBARD, JOHN P., and CLEMANS, WILLIAM V. "A Comparative Evaluation of Medical Schools." *Journal of Medical Education* 35: 134-41; February 1960.
- KACZKOWSKI, HENRY R., and CONNERY, THOMAS F. "PMA Factors as Predictors of High School Workshop Performance." *Psychological Newsletter* 9: 232-33; July-August 1958.
- KETTNER, NORMAN W.; GUILFORD, J. P.; and CHRISTENSEN, PAUL R. "A Factor-Analytic Study Across the Domains of Reasoning, Creativity, and Evaluation." *Psychological Monographs*: Vol. 73, No. 9 (Whole No. 479), 1959. 31 p.
- KLINGER, ERIC, and GEE, HELEN H. "The Study of Applicants, 1958-59." *Journal of Medical Education* 35: 120-33; February 1960.
- KRUMBOLTZ, JOHN D., and CHRISTAL, RAYMOND E. "Short-Term Practice Effects in Tests of Spatial Aptitude." *Personnel and Guidance Journal* 38: 385-91; January 1960.
- LAWSON, C. H., and SCHUCKER, R. E. "The Relative Efficiency of Four Test Weighting Methods in Multiple Prediction." *Educational and Psychological Measurement* 19: 103-14; Spring 1959.
- LAYTON, WILBUR L., and SWANSON, EDWARD O. "Relationship of Ninth Grade Differential Aptitude Test Scores to Eleventh Grade Test Scores and High School Rank." *Journal of Educational Psychology* 49: 153-55; June 1958.
- LITTLE, J. MAXWELL; GEE, HELEN H.; and NOVICK, MELVIN R. "A Study of the Medical College Admission Test in Relation to Academic Difficulties in Medical School." *Journal of Medical Education* 35: 264-72; March 1960.
- MERENDA, PETER F. "Relative Predictive Efficiency of a Short Versus a Long Test Battery for High School Students." *Psychological Reports* 8: 62; February 1961.
- MEYER, WILLIAM J. "The Stability of Patterns of Primary Mental Abilities Among Junior High and Senior High School Students." *Educational and Psychological Measurement* 20: 795-800; Winter 1960.
- MEYER, WILLIAM J., and BENDIG, A. W. "A Longitudinal Study of the Primary Mental Abilities Test." *Journal of Educational Psychology* 52: 50-60; February 1961.
- MICHAEL, WILLIAM B.; STEWART, ROGER; and RAINWATER, J. H., JR. "Factored Dimensions of the Career Test Battery." *Personnel Psychology* 12: 583-96; Winter 1959.
- MORGAN, ANTONIA B. "Selection of Scientific Talent." *Psychological Reports* 5: 83-86; March 1959.
- NORTH, ROBERT D. "Tests for the Accounting Profession." *Educational and Psychological Measurement* 18: 691-713; Winter 1958.
- RACKY, DONALD J. "Predictions of Ninth Grade Woodshop Performance from Aptitude and Interest Measures." *Educational and Psychological Measurement* 19: 629-36; Winter 1959.
- RAMSEY, ROBERT R., JR. "Law School Admissions: Science, Art, or Hunch?" *Journal of Legal Education* 12: 503-20; No. 4, 1960.
- RAMSEY, ROBERT R., JR. "Validity Patterns at Two Law Schools." *Educational and Psychological Measurement* 21: 489-91; Summer 1961.
- ROSENSKI, EDWIN F. "Must All Tests Be Multi-Factor Batteries?" *Journal of Experimental Education* 28: 235-40; March 1960.

- RUCH, FLOYD L., and RUCH, WILLIAM W. "Predicting Success in Draftsman Training with Short Time Limit Aptitude Tests." *Educational and Psychological Measurement* 20: 827-33; Winter 1960.
- SCHUMACHER, CHARLES F., and GEE, HELEN H. "The Relationship Between Initial and Retest Scores on the Medical College Admission Test." *Journal of Medical Education* 36: 129-33; February 1961.
- SCHUTZ, RICHARD E. "Factorial Validity of the Holzinger-Crowder Uni-Factor Tests." *Educational and Psychological Measurement* 18: 873-75; Winter 1958.
- SHARP, H. C., and PICKETT, L. M. "The General Aptitude Test Battery as a Predictor of College Success." *Educational and Psychological Measurement* 19: 617-23; Winter 1959.
- SMITH, D. D. "Abilities and Interest: I. A Factorial Study." *Canadian Journal of Psychology* 12: 191-201; September 1958. (a)
- SMITH, D. D. "Abilities and Interests: II. Validation of Factors." *Canadian Journal of Psychology* 12: 253-58; December 1958. (b)
- SMITH, D. D. "Traits and College Achievement." *Canadian Journal of Psychology* 13: 93-101; March 1959.
- SUPER, DONALD E. "The Use of Multifactor Test Batteries in Guidance." *Personnel and Guidance Journal* 35: 9-15; September 1956.
- THORNDIKE, ROBERT L., and HAGEN, ELIZABETH P. *Ten Thousand Careers*. New York: John Wiley & Sons, 1959. 346 p.
- TRAXLER, ARTHUR E. "Testing for the Professions: Accounting." *Journal of Experimental Education* 27: 341-46; June 1959.
- TYLER, LEONA E. "The Stability of Patterns of Primary Mental Abilities Among Grade School Children." *Educational and Psychological Measurement* 18: 769-74; Winter 1958.
- U.S. DEPARTMENT OF LABOR, BUREAU OF EMPLOYMENT SECURITY. *Guide to the Use of General Aptitude Test Battery: Section III. Development*. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1958.

CHAPTER IV

Development and Application of Tests of Educational Achievement

JACK C. MERWIN and ERIC F. GARDNER

OF ALL the areas of measurement influenced by the National Defense Education Act, achievement testing and aptitude testing have probably felt the greatest impact. In view of the possibilities for systematic research in this field, production has been disappointing since the last three-year review, by Ebel and Hill (1959). However, some gains have been made, and more are anticipated.

Test Development

In a well-designed pair of experiments, Dunn and Goldstein (1959) studied the relationship between items with specified characteristics and the difficulty, validity, and reliability of the achievement tests they comprised. Four issues were considered: (a) inclusion *versus* exclusion of irrelevant cues or specific determiners, (b) questions *versus* incomplete statements as leads, (c) equal-length alternatives *versus* extra-long alternatives, and (d) consistency *versus* inconsistency of grammar between leads and alternatives. Items with cues for correcting alternatives, with extra-long alternatives, and with grammatical inconsistencies between leads and alternatives were found to be less difficult than items written "according to the rules." There was no evidence that reliability or validity was affected by violation of the item-construction principles studied. Why an item writer would consider being grammatically inconsistent or using specific determiners was not made clear.

Cook (1959) studied another aspect of achievement-test items using Ebel's relevance categories. Items from several college achievement tests were studied. Items of "low relevance" were found to be the most discriminating, and items of "high relevance" less discriminating. Differences were found in the difficulty of the items of the various categories, but no trend was observed. "Fact" items were found to be more discriminating and easier than "interpretive" items to a statistically significant degree, but the practical value of these differentiations was questioned.

Mayo (1960) and Bligh (1958) studied various methods of scaling achievement tests. Mayo presented an inspectional method. He classified items as "good," "mediocre," and "poor" on the basis of degree of conformity to item patterns that would give a Loevinger coefficient of homogeneity of 1.00. He noted that homogeneity coefficients and Hoyt's reliability coefficients calculated for each of the three sets of items were generally in

the order he had expected; the "good" items gave higher coefficients than the "mediocre" items, which in turn gave higher coefficients than the "poor" items. He concluded that the inspectional method appeared to be feasible for selecting a homogeneous set of items, but the difference in psychological characteristics of homogeneous and heterogeneous sets of items is yet to be explained.

Bligh examined three tests from the *Stanford Achievement Test*, Advanced Battery, Form J, for homogeneity as defined by Loevinger and for unidimensionality as defined by Guttman. Coefficients of reproducibility clustered around .83, less than the .90 lower limit set by Guttman for considering a set of items as a scale. The magnitude of the coefficients suggested the need for further investigation of the scalability of achievement tests. However, the probability of obtaining Guttman-scaled items that adequately sample the achievement content is remote. The author set forth values of Loevinger's coefficient of homogeneity, Green's index of consistency, and Jackson's "plus percentage ratio" that might be expected for standardized achievement tests.

Additional References: Birkett (1959); Freeman and Stodola (1959); Juola (1960); Kaczkowski (1959); Letson (1958); Mallinson (1959); Rimland (1960a, b); Sochor (1958).

Testing Techniques.

Studies of testing techniques can, and do, vary widely. Some studies aim primarily at finding more efficient ways to use tests, while others center on the meaningfulness of the results obtained. Johnson and Lord (1958) compared two procedures for measuring group achievement using calculus items. In one procedure the same items were administered to all students; in the other, different items were administered to different students. They concluded that giving different items to different students was considerably more effective for estimating the mean score of a group, but would have only a very slight theoretical advantage over the usual procedure for ranking the means of several different groups.

In a well-designed study using a reading test, McDonald (1960) found that the reading process was impaired by periodic interruptions to announce time and that length of reading passage did not affect reading performance "under the conditions investigated by this study." Somewhat contradictory to the latter finding was that of Webb and Schwartz (1959), who found that the addition of reading material before the questions led to a negatively accelerated increase in between-subjects' variance and a positively accelerated increase in the error variance over the four experimental groups.

Hashimoto (1959) found that preannouncement of testing had a positive effect on the performance of Japanese elementary-school students on achievement tests. Page (1958) reported that teacher comments on test papers of high-school students resulted in improved performance on the subsequent test. Kalish (1958) concluded from his study with college stu-

dents that (a) open-book and closed-book procedures lead to similar numbers of errors, (b) the two procedures measure different abilities, and (c) student ratings of help received from the use of books are not related to scores. Westover (1958) found that reading questions aloud to psychology students produced results no different from those obtained by the usual procedure.

Additional References: Kooker and Williams (1959); Merenda and Macaluso (1959).

Scoring Problems

Two studies showed that serious problems of unreliability in essay testing remain. Anderson (1960) carried out a well-designed analysis-of-variance study to investigate the extent of variability contributed by tests, testing occasions, markers, marking occasions, and their interactions. Fifty-five eighth-grade students were administered the *Sequential Tests of Educational Progress (STEP) Essay Test*, Form A and Form B, for level 3, on four testing occasions. On four different marking occasions, each of three markers marked all 440 essays (eight from each of 55 students). The group analysis gave *F*-values for tests, testing occasions, markers, and interaction between markers and marking occasions, which were significant at the .01 level. Individual analyses were carried out on each of the 55 sets of eight essays each. Seventy-one percent of these analyses gave *F*-values for testing occasions significant at or beyond the .05 level; 78 percent of the *F*-values obtained for markers also were significant at the .05 level.

The Educational Testing Service (1961) reported a study of the rating of 300 essays written by first-year college students and rated by 53 "outstanding representatives of six different fields." Each judge rated each essay using a scale of one to nine. All essays received at least five of the nine possible ratings; 34 percent received all nine ratings; 37 percent received eight; 23 percent received seven; and 5 percent received six. Other studies using structured essays and detailed instructions for rating have shown much greater consistency among raters.

Problems of reliability of scoring are not limited to essay tests, as shown by the study of Phillips and Weathers (1958). The authors checked the scoring errors made by 51 third-grade and fourth-grade teachers in grading 5017 subject tests of the elementary and intermediate batteries of the *Stanford Achievement Test*. Twenty-eight percent of the papers had errors: 44.8 percent of these were counting errors; 26.1 percent were errors in following instructions; 14.9 percent were errors in use of keys; 13.5 percent were errors in use of tables; and 0.7 percent were errors in computation. Similar studies have shown that such errors tend to be randomly distributed and have minor effects on the interpretation of total test score.

Achievement Tests as Predictors

The lines of demarcation between tests classified as aptitude tests and those classified as achievement tests have for many years moved in and out of focus; there have been occasional bold attempts at re-definition.

Levine (1958) argued that both achievement and aptitude tests can be used for prediction and that they should be used together. He offered a distinction between two types of achievement tests, one given at the end of instruction to assess outcomes and the other prior to instruction for prediction. He separated the latter type from aptitude tests on the basis of generality of subject-matter content. Adkins (1958) maintained that the ultimate purpose of an achievement test is to predict performance and that the process of education would become chaotic if educators were completely unable to predict future performance from present achievement.

The most outstanding contribution to research evidence concerning the value of achievement tests as predictors came from three independent studies by Scannell (1960), Spaulding (1960), and Swanson and Layton (1959). All provided evidence to show that achievement-test results retain predictive efficiency over long periods.

Scannell (1960) studied the records of students who had taken the *Iowa Tests of Educational Development* in the twelfth grade. Some also had taken these tests in grades 9, 10, and/or 11, and some had taken the *Iowa Tests of Basic Skills* in grades 4, 6, and/or 8. He noted year-by-year increase in accuracy of prediction of college success, using achievement-test scores from grades 4 through 12. However, he concluded that useful predictions of college success can be made from achievement tests administered as early as the elementary-school years.

Spaulding (1960) found that achievement-test percentiles gave somewhat poorer predictions than adjusted high-school marks, when adjusted college freshman average grades were the criterion; this finding is consistent with the results of similar studies using unadjusted grades. After grade 9, achievement-test results for any one year were found to have about the same predictive value as those from any other year and were not greatly inferior to four-year averages.

Swanson and Layton (1959) correlated achievement-test results and other measures with scores on the *National Merit Scholarship Screening Test*. Scores obtained in the ninth grade in the *Cooperative Mathematics Test*, *Cooperative Science Test*, and *Cooperative Social Science Test* yielded a correlation of about .65 with *National Merit Scholarship Screening Test* scores obtained in twelfth grade. The composite score for the *Iowa Tests of Educational Development* correlated to about the same degree (with coefficients around .75) with *National Merit Scholarship Screening Test* scores regardless of whether they were obtained in tenth, eleventh, or twelfth grade.

A number of studies examined the predictive efficiency of specific tests and test batteries. Hansmeier (1960) found a correlation of .71 between the composite score of the *Iowa Tests of Educational Development* and freshmen grade-point averages. Powell and Parsley (1961) investigated the use of the *Lee-Clark Reading Readiness Test* for sectioning in first grade and examined correlations of the scores with reading-test scores in second grade. They concluded that the test is primarily useful for predicting general reading achievement for the total group.

Additional References: Aaron (1959); Belai (1958); Howell, Cliff, and Newman (1960); Robertson and Harrison (1960); Robinson (1958); White (1961).

Evaluative Studies

The development of several new tests and their initial research were reported during the period under review. A number of studies of specific tests and test batteries also were reported.

Sonnekus (1959) described the well-planned development and study of five achievement tests for first-year students in South African universities. These tests, in Afrikaans, English, chemistry, mathematics, and physics, were developed for the purpose of academic counseling. Students from Afrikaans-speaking universities were used in standardization. Reliability studies and validity studies, using average marks as a criterion, were carried out for majors in the B.A. program and in the B.Sc. program separately. Comparing the validity coefficients with those obtained using intelligence tests, the author concluded that the new achievement tests would provide better predictions than the intelligence tests, especially for B.Sc. candidates.

Ironically, studies involving tests built to measure students' achievement in the area of educational measurement appear in the literature considerably less frequently than tests in other areas. Ebel (1960), in presenting the *Inventory of Measurement Vocabulary Knowledge and Measurement Specialists Identification Test*, cited the need for measurement people to check the order of their own households. With the *Inventory*, in true-false form, he found true items to be easier and less discriminating than false items; in matching form, the items were found to be more difficult and more discriminating than in true-false form.

Traxler (1959) administered the *STEP Mathematics Test* to independent-school students at grade levels one step below the levels recommended by the publishers. He correlated the results with mathematics course marks and then compared these findings with correlations between other measures and the mathematics marks. The number of cases used for each coefficient was small, ranging from 12 to 43. A variety of scholastic-aptitude measures used were shown to be better predictors of mathematics grades than the *STEP Mathematics Test*. Adding the *STEP* scores to the other measures of scholastic aptitude improved prediction very little.

Analyses of three administrations of the 1959 edition of the *Metropolitan Achievement Tests* to students from member schools of the Educational Records Bureau were reported by North (1959, 1960) and Jungeblut (1961). In one of these studies, North (1959) found a sufficient number of perfect scores on the Primary II Battery to conclude that ceiling effect would probably be acute on this battery for second-grade pupils in independent schools. He reported substantial correlation between the new *Metropolitan Achievement Tests* and comparable or similar tests from Form K of the *Stanford Achievement Tests*. He also found the *Metropolitan Achievement Tests*, Primary II Battery, Form A grade-equivalent scores to be fairly comparable to those of the *Stanford Achievement Test*, Primary Battery, Form K.

Jungeblut (1961) reported an analysis of results on the *Metropolitan Achievement Tests*, 1959 edition, Form A, obtained from the 1960 fall independent-school program. She concluded that the *Metropolitan Achievement Tests* seem to provide valuable measurement of achievement at lower grade levels, but noted that for seventh-grade and eighth-grade independent-school students, the subtests in the partial *Stanford Achievement Test* battery appeared to provide more ceiling than comparable measures from the *Metropolitan Achievement Tests*.

Stake (1961) compared the grade-equivalent scores of 570 third-grade children, subgroups of which had taken the *California Achievement Tests*, *Iowa Tests of Basic Skills*, *Metropolitan Achievement Tests*, *SRA Achievement Series*, or *Stanford Achievement Test*. These students had all entered kindergarten early, and the groups that took the different subtests were shown to have comparable means and standard deviations of their mental ages from preschool scores on the *Stanford-Binet Scale*. The results were similar for all tests except the *California Achievement Tests*, which gave significantly higher grade equivalents.

Additional References: Berwick (1959); Haberland (1959); Halfter and Douglass (1960); Heinberg (1959); Loret and West (1959); Metfessel and Sax (1958); Traxler (1960); Trivette (1961); Vecchione (1960).

Characteristics of Achievement Tests Revealed Through Factor Analysis

Achievement-test measures were included in a number of factor-analysis studies. Gowan (1958), using measures on college-of-education upper-classmen and graduate students, found the five-part scores on the *Cooperative English Test*, scores on the *Stanford Achievement Test* in arithmetic, and scores on the *ACE Psychological Examination for College Freshmen* loaded primarily on a single factor that did not include high loadings from personality measures used in the analysis. Schutz (1960) also obtained a single major factor from the scores of sixth-grade students on

the paragraph-meaning test and the arithmetic-reasoning test of the *Stanford Achievement Test* when they were factor-analyzed with measures of community characteristics.

Using the results from testing ninth-grade students, Cassell and Stancik (1960) factor-analyzed 15 scores, of which 8 were from the *Iowa Tests of Educational Development (ITED)*, the remainder being from the *Co-operative English Test*, lower level, Reading Comprehension CI-Y and from general and differential aptitude tests. Of the six orthogonally rotated factors, the most interesting was labeled "reading competency." The authors reported that this factor "could not be considered factorially pure in any sense of the statistical concept" (p. 196). However, it carried the highest loadings for six of the *ITED* (all above .62) and a .54 loading for "quantitative." It also had the only significant factor loadings for the Reading Comprehension test (.71) and the Verbal Reasoning test of the *Differential Aptitude Tests* (.72).

Additional References: Rupiper (1960); Wolins, MacKinnéy, and Stephens (1961).

Personality Characteristics and Achievement Testing

During the three-year period under review, most of the studies relating personality characteristics to achievement testing centered on anxiety. Sarason and others (1960) discussed the results of an extensive series of studies. In summarizing some of the main conclusions of this type of research, Sarason (1959) reported the following: (a) Level of test anxiety tended to increase with grade level. (b) When matched as to grade, sex, and IQ, high-anxious students performed at a lower level on problem-solving tasks than did their peers who were less anxious. (c) The difference in performance of students with high and not-so-high levels of test anxiety increased when the students were not sure what was expected of them and when they were expected to function independently. (d) When the pupils' needs for direction and dependence were partly met by the problem-solving situation, differences in performance across anxiety levels were quite small, showing a tendency for the high-anxious children to surpass the low-anxious children in performance.

Other studies of anxiety and achievement testing used some of the same scales as the Sarason studies. Smith and Rockett (1958) found no significant *F*-values for the individual variables in four replications of an analysis of variance based on (a) three instructors, (b) three types of instructions to psychology students regarding their written comments about items on their final examination papers, and (c) two extreme degrees of anxiety determined from scores on the *Sarason Anxiety Scale*. The anxiety-instructions interaction was significant at the .04 level. Grooms and Endler (1960) also found no significant relationship among college psychology students between test anxiety and academic achievement as measured by grade-point average. Reese (1961) obtained significant results, how-

ever, studying 539 fourth-grade and sixth-grade children. Using the *Children's Manifest Anxiety Scale* and a 40-item addition test, he obtained significant negative correlations for males in both fourth and sixth grades and for females in sixth grade. Partialing out IQ had little effect on the size of the correlation coefficients obtained. McDonald (1960) found that periodic interruptions had a significant detrimental effect on the reading-test performance of students noted as high-anxious.

Mohandessi (1959) investigated relationships among several motivational variables and results on an achievement test, through verbal instructions and stated purposes of the use of results. He concluded that motive to achieve can be aroused by the methods employed in this study. Performance under strong achievement motive, however, was found to be inferior to performance under strong affiliation motivation on arithmetic operations tasks.

Additional Reference: Michael, Jones, and Trembly (1959).

Need for Further Research

There is continued serious need for research that will lead to more effective achievement-test construction and use. During the period under review, noticeable progress has been made in understanding the use of achievement tests as predictors and the relationship between anxiety and achievement-test performance.

The need for research in the development and use of achievement tests as part of the educational process was underscored by Adkins (1958), but only meager attempts in this area were reported in the literature.

While research on all aspects of achievement testing is needed, in the reviewers' opinion, high priority should be given to research in its development and use and to research that will provide greater understanding of the relationship and conditions of relationship between achievement tests and such variables as aptitude, motivation, interest, social relations, and personality.

Bibliography

- ADKINS, DOROTHY C. "Measurement in Relation to the Educational Process." *Educational and Psychological Measurement* 18: 221-40; Summer 1958.
- ANDERSON, C. C. "The New STEP Essay Test as a Measure of Composition Ability." *Educational and Psychological Measurement* 20: 95-102; Spring 1960.
- BLIGH, HAROLD F. "An Empirical Investigation of Three Methods of Scaling Achievement Tests Based upon the Inter-Relationships of Test Items." *Fifteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1958. p. 80-86.
- CASSELL, RUSSELL N., and STANCIK, EDWARD J. "Factorial Content of the Iowa Tests of Educational Development and Other Tests." *Journal of Experimental Education* 29: 193-96; December 1960.
- COOK, DESMOND L. "Relevance Categories and Item Statistics." *Sixteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1959. p. 86-94.

- DUNN, THEODORE F., and GOLDSTEIN, LEON G. "Test Difficulty, Validity, and Reliability as Functions of Selected Multiple-Choice Item Construction Principles." *Educational and Psychological Measurement* 19: 171-79; Summer 1959.
- EBEL, ROBERT L. "Some Tests of Competence in Educational Measurement." *Seventeenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1960. p. 93-104.
- EBEL, ROBERT L., and HILL, ROBERT E., JR. "Development and Applications of Tests of Educational Achievement." *Review of Educational Research* 29: 42-56; February 1959.
- EDUCATIONAL TESTING SERVICE. "Judges Disagree on Qualities That Characterize Good Writing." *ETS Developments* 9: 2; February 1961.
- GOWAN, J. C. "Intercorrelations and Factor Analysis of Tests Given to Teaching Candidates." *Journal of Experimental Education* 27: 1-22; September 1958.
- GROOMS, ROBERT R., and ENDLER, NORMAN S. "The Effect of Anxiety on Academic Achievement." *Journal of Educational Psychology* 51: 299-304; October 1960.
- HANSMEIER, THOMAS W. "The Iowa Tests of Educational Development as Predictors of College Achievement." *Educational and Psychological Measurement* 20: 843-45; Winter 1960.
- HASHIMOTO, JUJI. "Test no yokoku kōka ni tsuite [The Effect of Announcement of the Coming Test]." *Japanese Journal of Educational Psychology* 6: 217-22, 265; March 1959.
- JOHNSON, M. CLEMENS, and LORD, FREDERIC M. "An Empirical Study of the Stability of a Group Mean in Relation to the Distribution of Test Items Among Students." *Educational and Psychological Measurement* 18: 325-29; Summer 1958.
- JUNGEBLUT, ANN. "An Analysis of the 1960 Fall Independent School Program Results on the Metropolitan Achievement Tests, 1959 Edition, Form A." *1960 Fall Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 78. New York: Educational Records Bureau, February 1961. p. 61-67.
- KALISH, RICHARD A. "An Experimental Evaluation of the Open Book Examination." *Journal of Educational Psychology* 49: 200-204; August 1958.
- LEVINE, ABRAHAM S. "Aptitude Versus Achievement Tests as Predictors of Achievement." *Educational and Psychological Measurement* 18: 517-25; Autumn 1958.
- MCDONALD, ARTHUR S. "Factors Affecting Reading Test Performance." *Research and Evaluation in College Reading*. Ninth Yearbook. National Reading Conference for College and Adults. Fort Worth: Texas Christian University Press, 1960. p. 28-35.
- MAYO, SAMUEL T. "An Inspectional Method of Scaling Achievement Tests." *Seventeenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1960. p. 59-64.
- MOHANESSI, KHOSSROW. *Situational Motivation and Achievement-Test Performance of Hopeful and Fearful Pupils*. Doctor's thesis. Urbana: University of Illinois, 1959. 122 p. Abstract: *Dissertation Abstracts* 20: 3199-3200; No. 8, 1960.
- NORTH, ROBERT D. "Trial Use of the 1959 Edition of the Metropolitan Achievement Tests in Some ERB Member Schools." *1959 Achievement Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 74. New York: Educational Records Bureau, July 1959. p. 61-74.
- NORTH, ROBERT D. "An Appraisal of Independent School Results on the Primary Levels of the Metropolitan Achievement Tests, 1959 Edition." *1960 Achievement Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 77. New York: Educational Records Bureau, July 1960. p. 55-66.
- PAGE, ELLIS B. "Teacher Comments and Student Performance: A Seventy-Four Classroom Experiment in School Motivation." *Journal of Educational Psychology* 49: 173-81; August 1958.
- PHILLIPS, BEEMAN N., and WEATHERS, GARRETT R. "Analysis of Errors Made in Scoring Standardized Tests." *Educational and Psychological Measurement* 18: 563-67; Autumn 1958.
- POWELL, MARYIN, and PARSLEY, KENNETH M., JR. "The Relationships Between First Grade Reading Readiness and Second Grade Reading Achievement." *Journal of Educational Research* 54: 229-33; February 1961.
- REESE, HAYNE W. "Manifest Anxiety and Achievement Test Performance." *Journal of Educational Psychology* 52: 132-35; June 1961.
- SARASON, SEYMOUR B. "What Research Says About Test Anxiety in Elementary School Children." *NEA Journal* 48: 26-27; November 1959.

- SARASON, SEYMOUR B., and OTHERS. *Anxiety in Elementary School Children*. New York: John Wiley & Sons, 1960. 351 p.
- SCANNELL, DALE P. "Prediction of College Success from Elementary and Secondary School Performance." *Journal of Educational Psychology* 51: 130-34; June 1960.
- SCHUTZ, RICHARD E. "A Factor Analysis of Academic Achievement and Community Characteristics." *Educational and Psychological Measurement* 20: 513-18; Autumn 1960.
- SMITH, WILLIAM F., and ROCKETT, FREDERICK C. "Test Performance as a Function of Anxiety, Instructor and Instructions." *Journal of Educational Research* 52: 138-41; December 1958.
- SONNEKUS, M. C. H. "The Standardisation and Predictive Value of a Battery of Academic Achievement Tests for the Purpose of Academic Counseling at South African Universities." *British Journal of Educational Psychology* 29: 136-43; June 1959.
- SPAULDING, GERALDINE. *The Application of Secondary School Cumulative Record Data to the Prediction of College Success*. New York: Educational Records Bureau, July 1960. 42 p. (Mimeo.)
- STAKE, ROBERT E. "'Overestimation' of Achievement with the California Achievement Test." *Educational and Psychological Measurement* 21: 59-62; Spring 1961.
- SWANSON, EDWARD O., and LAYTON, WILBUR L. "Relationship of National Merit Scholarship Screening Test Scores to Test Data Obtained Earlier in High School." *Journal of Applied Psychology* 43: 32-34; February 1959.
- TRAXLER, ARTHUR E. "Correlation of STEP Mathematics Test and Certain Other Measures with Mathematics Marks of Independent School Pupils." *1958 Fall Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 73. New York: Educational Records Bureau, February 1959. p. 57-63.
- WEBB, WILSE B., and SCHWARTZ, MARVIN. "Measurement Characteristics of Recall in Relation to the Presentation of Increasingly Large Amounts of Material." *Journal of Educational Psychology* 50: 63-65; April 1959.
- WESTOVER, FREDERICK L. "A Comparison of Listening and Reading as a Means of Testing." *Journal of Educational Research* 52: 23-26; September 1958.

Additional References

- AARON, I. E. "The Relationship of Selected Measures to Spelling Achievement at the Fourth and Eighth Grade Levels." *Journal of Educational Research* 53: 138-43; December 1959.
- BELAI, LOUISA. "A Comparative Study of the Results of Standardized Tests and Achievement at a Liberal Arts College for Women." *Journal of Educational Research* 52: 94-100; November 1958.
- BERWICK, MILDRED. "The Semantic Method for Testing Vocabulary." *Journal of Experimental Education* 28: 123-41; December 1959.
- BIRKETT, GERALDINE. "Remedial Measures for Teachers Based on a Study of Teacher-Made Tests and What They Disclosed." *Reading in a Changing Society*. Proceedings of the 1959 Conference of the International Reading Association. New York: Scholastic Magazines, 1959. p. 178-81.
- FREEMAN, PAUL M., and STODOLA, QUENTIN C. "Nonstatistical Characteristics of Reading Comprehension Items with Certain Discrimination Characteristics." *Sixteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1959. p. 75-85.
- HABERLAND, JOHN A. "A Comparison of Listening Tests with Standardized Tests." *Journal of Educational Research* 52: 299-302; April 1959.
- HALFTER, IRMA T., and DOUGLASS, FRANCES M. "Measurement of College Level Reading Competence in a Content Area." *Journal of Educational Research* 53: 223-30; February 1960.
- HEINBERG, PAUL. "An Experimental Investigation of Measuring Diction." *Journal of Educational Research* 52: 303-306; April 1959.
- HOWELL, MARGARET A.; CLIFF, NORMAN; and NEWMAN, SIDNEY H. "Further Validation of Methods for Evaluating the Performance of Physicians." *Educational and Psychological Measurement* 20: 69-78; Spring 1960.

- JUOLA, ARVO E. "Internal Versus External Criteria in Selecting Reading Test Items." *Seventeenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1960. p. 65-69.
- KACZKOWSKI, HENRY R. "Using Expectancy Tables To Validate Test Procedures in High School." *Educational and Psychological Measurement* 19: 675-77; Winter 1959.
- KOOKER, EARL W., and WILLIAMS, CHESTER S. "College Students' Ability To Evaluate Their Performance on Objective Tests." *Journal of Educational Research* 53: 69-72; October 1959.
- LETSON, CHARLES T. "Speed and Comprehension in Reading." *Journal of Educational Research* 52: 49-53; October 1958.
- LORET, PETER G., and WEST, RICHARD B. "The Cancer Achievement Testing Program: I. An Overview." *Journal of Medical Education* 34: 512-22; May 1959.
- MALLINSON, GEORGE G. "An Analysis of the Effect of Test Format on the Achievement of Students in General Psychology." *Sixteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1959. p. 117-20.
- MERENDA, PETER F., and MACALUSO, CHARLES J. "The Relative Validity of Verbal vs. Illustration Items in Achievement Type Tests for Low Verbal Ability Personnel." *Journal of Experimental Education* 28: 153-62; December 1959.
- METFESSEL, NEWTON S., and SAX, GILBERT. "Systematic Biases in the Keying of Correct Responses on Certain Standardized Tests." *Educational and Psychological Measurement* 18: 787-90; Winter 1958.
- MICHAEL, WILLIAM B.; JONES, ROBERT A.; and TREMBLY, W. A. "The Factored Dimensions of a Measure of Motivation for College Students." *Educational and Psychological Measurement* 19: 667-71; Winter 1959.
- RIMLAND, BERNARD. "The Effect of Including Extraneous Numerical Information in a Test of Arithmetic Reasoning." *Educational and Psychological Measurement* 20: 787-94; Winter 1960. (a)
- RIMLAND, BERNARD. "The Effects of Varying Time Limits and of Using 'Right Answer Not Given' in Experimental Forms of the U.S. Navy Arithmetic Test." *Educational and Psychological Measurement* 20: 533-39; Autumn 1960. (b)
- ROBERTSON, MALCOLM H., and HARRISON, MILDRED M. "Reading Skill as a Predictor of College Achievement." *Journal of Educational Research* 53: 258-62; March 1960.
- ROBINSON, DONALD W. "A Comparison of Two Batteries of Tests as Predictors of First Year Achievement in the Graduate School of Bradley University." *Fifteenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1958. p. 118-27.
- RUPIPER, OMER J. "Multiple Factor Analysis of Academic Achievement; A Comparative Study of Full-Blooded Indian and White Children." *Journal of Experimental Education* 28: 177-205; March 1960.
- SOCHOR, E. ELONA. "Literal and Critical Reading in Social Studies." *Journal of Experimental Education* 27: 49-56; September 1958.
- TRAXLER, ARTHUR E. "Some Data on the Difficulty, Reliability, and Validity of a New Spelling Test for the Primary Grades." *1960 Achievement Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 77. New York: Educational Records Bureau, July 1960. p. 67-73.
- TRIVETTE, SUE E. "The Effect of Training in Listening for Specific Purposes." *Journal of Educational Research* 54: 276-77; March 1961.
- VECCHIONE, NICHOLAS. "A Further Study of the Cooperative French Listening Comprehension Test." *1960 Achievement Testing Program in Independent Schools and Supplementary Studies*. Educational Records Bulletin, No. 77. New York: Educational Records Bureau, July 1960. p. 75-82.
- WHITE, ADOLPH. "The Aliferis Music Achievement Test as a Predictor of Success in Music Theory at St. Olaf College." *Journal of Educational Research* 54: 315-17; April 1961.
- WOLINS, LEROY; MACKINNEY, A. C.; and STEPHANS, PAUL. "Factor Analyses of High School Science Achievement Measures." *Journal of Educational Research* 54: 173-77; January 1961.

CHAPTER V

Development and Application of Structured Tests of Personality

RAYMOND A. KATZELL and MILDRED E. KATZELL

SEVERAL HUNDRED books, monographs, and articles have been published during the past three years describing the development, application, validity, reliability, and norms of various structured measures of personality. In the summary to follow, the major focus is on those that reported on the application of such instruments to various relevant problems and on their validity when so applied.

The major part of this presentation is organized according to the particular instruments studied. For each established instrument, studies that bear mainly on its concurrent or predictive validity have been reported first; next, studies that serve largely to clarify the construct or constructs being measured—in which category factor analyses are included. Factor analyses that included more than one test are reported in an ensuing subsection.

Three other major sections follow: a brief report on new instruments, a summary of studies dealing with the problem of response sets and distortion, and a statement of trends and needs apparent from the work of the past three years.

Application and Validation of Standard Tests

Several tests and inventories that were commonly used during the period covered by the February 1959 REVIEW continued to be prominent during the past three years. In addition, increasing use was made of a few of the newer instruments, and many others, old and new, were employed in occasional studies.

Minnesota Multiphasic Personality Inventory (MMPI)

The *MMPI* continued to be, by far, the most frequently reported personality inventory. Several studies added to the already rich evidence of its ability to discriminate between groups on the basis of behavior disorder. For example, Meehl and Dahlstrom (1960) developed a set of objective profile signs for the *MMPI* which they believed, on the basis of both statistical analysis and clinical experience, would discriminate between psychotics and neurotics. In cross-validation samples, 30 percent of the

cases were classified as indeterminate, whereas about 73 percent of the remainder were shown to be classified correctly on the basis of these *MMPI* profile signs.

Illustrative of the studies designed to illuminate the construct meaning of various of the *MMPI* scales was that of Binder (1958), who hypothesized a positive relationship between a subject's score on the Paranoia scale and the number of cues required for him to state his recognition of a visual figure. His study supported the hypothesis by finding a statistically significant correlation of .49 between the two variables.

Factor analysis was applied in a number of studies to define the dimensions underlying the *MMPI*. Kassebaum, Couch, and Slater (1959) so analyzed 32 standard *MMPI* scales. They identified clearly only two factors, labeled ego-weakness *versus* ego-strength and introversion *versus* extroversion. These results coincided with many others in the personality domain. A study by Lingo (1960) lent support to those who had proposed a more complex dimensional picture; analyzing 38 rational scales of the *MMPI*, he found 11 factors that appeared in at least three of the four samples studied. To some extent, the picture of the *MMPI*'s factorial composition would understandably seem to depend on the scales used in the analysis.

Others have chosen to factor-analyze *MMPI* items rather than scales. O'Connor and Stefic (1959) did so for the 33 items composing the Hypochondriasis scale and found three oblique primary factors and a second-order factor described as "concern with health." Comrey (1958a, b) continued his series with factor analyses of the items on the *MMPI* F and K scales. The former yielded 19 factors and the latter 13, some of which were similar in both analyses. In each instance, many of the factors appeared to consist of abnormal reactions, which raised the question whether the scales can properly be regarded simply as validity indicators. Comrey and Soufi (1960) wrote new items to measure each of nine *MMPI* factors identified in earlier research. A factor analysis of these items resulted in the original factors plus four others. The clearest factors were shyness, sensitivity, cynicism, sex concern, and agitation.

Edwards Personal Preference Schedule (EPPS)

The validity of the *EPPS* was investigated by Zuckerman (1958), using the time-honored method of determining its degree of association with ratings of behavior. He identified groups of "dependent" and "rebellious" students by means of peer ratings. The "rebellious" subjects were significantly higher than the "dependent" ones on *EPPS* Autonomy, Dominance, and Aggression scores and significantly lower on Deference, Succorance, and Abasement.

A group of studies investigated the *EPPS* in relation to college achievement. Weiss, Wertheimer, and Groesbeck (1959) found a correlation of

.42 between the *EPPS* achievement score and grade-point average; the multiple correlation when combined with an academic-aptitude test was .64. Demos and Spolyar (1961) found no differences between the average *EPPS* scores of college students whose academic performance was in line with their aptitude and those of overachieving and underachieving college students. However, Krug (1959) found that overachievers scored significantly higher than underachievers on the Achievement, Endurance, and Order scales, and lower on the Affiliation and Heterosexuality scales. It is worth noting that Krug used engineering students and that his results substantially duplicated those of an earlier study of such students.

In the domain of the *EPPS*'s construct validity, Gisvold (1958) found that conforming behavior, as measured in the Asch-Crutchfield type of experiment, yielded a significant correlation of $-.54$ with *EPPS* Autonomy scores, as hypothesized, but had no significant relation to Deference scores. Izard (1960) employed a different experimental measure of resistance to interpersonal influence and found that in a sample of college men, as hypothesized, it correlated significantly with three *EPPS* scales: Autonomy, .38; Dominance, .38; Abasement, $-.35$. The construct underlying the *EPPS* Achievement score was investigated by Worell (1960), who found that high-scoring subjects showed significant superiority over low-scoring subjects in two verbal-learning tasks. On the other hand, Atkinson and Litwin (1960) found that the Achievement scale was not significantly correlated either with two other purported tests of achievement, motivation or with performance in experimental tasks; appropriately, they concluded that more research was needed on the achievement-motive construct and its measures.

Levonian and others (1959) made a separate factor analysis of the items composing each of the 15 *EPPS* scales. They found that the items in each scale had low intercorrelations, indicating that it is unlikely that each scale contains a general factor. From these and other results, the authors inferred that there is a discrepancy between what the *EPPS* is designed to measure and the actual item factorial content.

Anxiety Scales

The validity of the *Taylor Manifest Anxiety Scale (TMAS)* was further demonstrated by studies reporting its significant relationships with meaningful criteria. Terwilliger and Fiedler (1958) found that its scores indicated significantly more maladjustment in students who sought help at a college counseling center than in student controls. Lauterbach (1958) found that *TMAS* scores of psychiatric referrals correlated .44 ($p < .01$) with psychologists' ratings of their anxiety. In an unusual study of predictive validity by Davids, DeVault, and Talmadge (1961), pregnant women who were later to experience complications in childbirth or give birth to

abnormal children were found to have significantly higher *TMAS* scores than those who were to have normal deliveries; the general problem under investigation concerned emotional factors in childbirth and pregnancy.

In a study of the test's construct validity by Taylor and Rechtschaffen (1959), *TMAS* scores were found to be inversely related to performance in an experimental task, in line with a derivation from Hullian theory to the effect that high drive level would adversely affect performance in such a task. Grosz and Levitt (1959) hypnotically induced anxiety and found a significant increase in *TMAS* scores. This study is of special interest because of the use of a personality test as a dependent variable in experimental manipulations.

Alpert and Haber (1960) studied five anxiety scales in relation to college achievement as determined by both examination scores and grade-point averages. Three of the scales were measures of general anxiety: *TMAS*, *Welsh Anxiety Index*, and *Freeman MA Test*. Two were measures of specific or situational anxiety: *Mandler-Sarason Test Anxiety Scale* and *Achievement Anxiety Scale*. Correlational evidence among the tests and achievement measures indicated that the general and specific scales measured different things and that the latter two specific measures were better predictors of academic performance.

The *Children's Manifest Anxiety Scale (CMAS)* began to be put to considerable use in research in school settings. Kitano (1960) found it capable of differentiating significantly between elementary-school boys in regular classes and those in adjustment classes. In a study by Iscoe and Cochran (1960), teachers' ratings of adjustment significantly differentiated in the expected direction between groups of elementary-school pupils who scored at either extreme on the test. On the other hand, L'Abate (1960) found the *CMAS* to be generally unrelated to teachers' ratings of adjustment of boys and girls.

Other Personality Inventories

The *Maudsley Personality Inventory (MPI)* has been used in several studies to test various theoretical postulates of Eysenck. Sigal, Star, and Franks (1958) compared scores of normal, dysthymic (anxious neurotic), hysteric, and psychopathic subjects. The normals had significantly lower Neuroticism scores than the other groups. On the Extroversion scale, dysthymics had the lowest and psychopaths the highest average scores; however, since the hysterics and psychopaths together did not score significantly higher than dysthymics—a finding that was in conflict with Eysenck's theory—the authors concluded that either the Extroversion scale or the theory is faulty. Eysenck (1958) replied that the scale did differentiate among the four groups in the manner predicted by his theory and that, although not all differences between pairs were statistically significant, account should be taken of the small number of cases. Eysenck

(1961) confirmed another of the predictions from his theory—that extroverts are more tough-minded than introverts; he used *MPI* scales to measure these two variables. However, Bendig (1958) did not find this relationship when measuring extroversion with the older *MPI* and tender-mindedness with Melvin's scale.

Using the *Sixteen Personality Factor Questionnaire* (16 PF) with anxiety neurotics, general medical somatics, and normal subjects, Karson (1959) showed that the former two were differentiated on three factors of the test, the normals and somatics on seven factors, and normals and neurotics on twelve. Replicating Cattell's second-order factor analysis of this instrument, Karson and Pool (1958) identified three of the same four second-order factors reported by Cattell, the exception being cyclothymic versus schizothymic constitution.

There were several studies in which scores on the *Guilford-Zimmerman Temperament Survey* (GZTS) were correlated with criteria of performance in work or study. Witherspoon and Melberg (1959) reported that three of the test's ten scales showed significant low positive correlations with grade-point averages of college freshmen. Wilson (1959) found significant positive correlations of the test's Restraint and Thoughtfulness scores with job ratings of salesmen, but Wagner (1960) reported that none of the scales correlated significantly with superiors' ratings of job success for 150 young executives in four companies. Bendig (1960a) performed factor analyses of the scores on ten scales by four samples of men differentiated by age level. Since the scales were originally devised on the basis of factor analysis, the resulting factors should be regarded as more nearly second-order than primary. Three such orthogonal factors were extracted: friendliness, social activity, and extroversion-introversion. This factor structure was somewhat stable across age levels.

The *California Psychological Inventory* (CPI), another offshoot of the *MMPI*, gained in prominence. There were reports of a number of studies of this test's relationships with status groups or with performance criteria. Peterson, Quay, and Anderson (1959) found the Socialization scale capable of differentiating in the predicted manner between groups of boys who had delinquency or disciplinary problems and those who did not. Holland (1959) reported that the CPI was useful in predicting college-freshman grades of winners of National Merit Scholarships and National Merit Certificates. Combined *College Entrance Examination Board Scholastic Aptitude Test* (SAT) and CPI scores yielded multiple correlations of .32 for boys and .23 for girls, two to three times as large as the zero-order correlation yielded by SAT scores alone. The CPI was generally not predictive of the effectiveness of managers in 13 companies in a study by Mahoney, Jerdee, and Nash (1960). Mitchell and Pierce-Jones (1960) performed a factor analysis of the 18 CPI scales for a sample of college students. Four orthogonal factors emerged: adjustment by social conformity, social poise or extroversion, superego strength, and capacity for independent thought and action.

In a study by Willingham, Nelson, and O'Connor (1958), the *Gordon Personal Profile* did not differentiate between trainees who remained in the Air Force and those who withdrew; and it yielded no significant correlations with ratings of salesmen in Ash's (1960) investigation.

Interest and Attitude Inventories

Measurements of interest made with the *Strong Vocational Interest Blank (SVIB)* continued to show concurrent and predictive validity. Ten scales, nine occupational scales and the occupational level scale, correlated with managerial effectiveness in 13 companies at a level of significance of .10 or better in a study by Mahoney, Jerdee, and Nash (1960). Boyd (1961) found that engineering trainees who later remained or withdrew from a company were differentiated by their item responses. Using the McClelland-Atkinson picture technique as a measure of need to achieve, Mahone (1960) found high need associated with congruence of vocational choice with *SVIB* interests and low need associated with discrepant vocational choice.

Among studies employing the *Kuder Preference Record (KPR)* was that of Wagner (1960), who, using three scales of the *KPR*—*Personal* and one scale of the *KPR*—*Vocational*, obtained significant correlations with superiors' ratings of success on the job for 150 young executives in four companies.

Several studies showed a positive relationship between supervisors' ratings of teachers' effectiveness and their scores on the *Minnesota Teacher Attitude Inventory* (Standlee and Popham, 1959; Popham and Trimble, 1960; Day, 1959). The first two of these studies were performed with subjects already serving as teachers; the last was based on scores obtained while the subjects were college seniors and was, therefore, a report of predictive validity.

Factor Analyses

In addition to factor analyses of items and scales composing individual tests, as reported above, there were a number of factorial studies simultaneously covering more than one test. Some of these attempted to define general dimensions of personality and their representation in various tests. A study by Bendig (1960b) of this general type had the additional desirable feature of aiming to test contrasting positions in the theory of personality. The instruments included *TMAS*, *MPI*, some of the Cattell scales, and the *MMPI* L scale. One of the interesting findings was the indication that both anxiety and neuroticism are facets of a more general factor labeled emotionality.

Studies that attempted not only to identify personality dimensions and their measures but also to pursue behavioral correlates or consequences

of these factors were a desirable extension of factor analysis. Caron and Wallach (1959) undertook to study the dimension underlying tests in the areas of ego strength, need for achievement, and hysteria. They factor-analyzed 38 scores of a sample of college freshmen, including scores for the *EPSS*, *MMPI*, *F*-scale of authoritarianism, and Guilford's *Inventory of Factors STDCR*. Five orthogonal factors emerged: neuroticism, extroversion-introversion, intellectual flexibility, other-orientation *versus* self-orientation, and perseverance for achievement. They then studied how these five factors related to indicators of the use of repressive and obsessive defense mechanisms. Only perseverance for achievement was found to be so related, with high scorers tending to react obsessively and low scorers repressively. Interested in predicting role behavior in small groups of Air Force officers, Borg (1960) factor-analyzed a battery of personality measures presumed to be related to such behavior, including *FIRO*, the *F*-scale and the *Guilford Opinion Survey* among others. The scores on the resulting four factors were then correlated with the degree to which each subject fitted each of six group roles; the clearest of the several significant results was a correlation of .46 between the assertiveness-factor score and the assumption of leadership roles.

Illustrating another type of factorial study, of which more examples would be welcome, was an effort by Comrey and Soufi (1961)* to verify the existence of 19 previously identified personality factors by constructing sets of new items designed clearly to measure each such factor, and then refactoring the results. Twelve of the factors were clearly established, a few others had poor definition, and two dropped out altogether.

New Instruments

Most of the new developments were still in the early experimental stage, and those that survive will be reported when they are better established. However, several instruments seemed to be far enough along to be considered as additions to the repertory, at least for research purposes.

Two such instruments fell in the category of the multidimensional personality inventory. Cattell, Beloff, and Coan (1958) published the *IPAT High School Personality Questionnaire*, which is generally similar in development, form, and scope to the *16 PF* for adults. Jenkins (1959) prepared an inventory for adolescents and adults covering 17 traits and two aspects of test-taking attitude in 120 items; the traits were defined and the items selected on the basis of factor analysis.

In the attitude-interest domain, there was a flurry of attention to the *Parental Attitude Research Instrument* developed by Schaefer and Bell (1958), which measures attitudes toward child-rearing practices. A few studies supported the validity of the instrument. For example, Madoff (1959) reported that mothers of delinquents gave significantly different responses than mothers of nondelinquents on 9 of the inventory's 20 scales.

The area of interpersonal relations appeared to be receiving increasing attention from instrument developers. Schutz (1958) constructed a questionnaire called *FIRO-B* which analyzes the behavior the individual expresses toward others and the behavior he wants others to manifest in relation to him; it includes aspects of behavior related to needs for inclusion, control, and affection. Shutz reported numerous studies of concurrent and predictive validity, mainly in laboratory situations, generally supporting the validity of the instrument and its underlying theory of interpersonal compatibility.

Gardner and Thompson (1959) published a sociometric device in which the examinee rates classmates in two hypothetical situations. Scores express each pupil's view of his classmates in relation to their ability to satisfy two of his needs, succorance and deference, and indicate how each pupil is evaluated by the others with respect to his ability to satisfy these needs. This instrument was an outgrowth of a series of research studies which generally supported the validity of the approach.

Response Sets and Distortion

In a continuation of a current of research that has been under way for some years, it was shown that various inventories are susceptible in varying degrees to various types of instructions for conditions of administration. Studies also have contributed additional refinements and embellishments to the awareness that desirability values exist for inventory items, that more desirable items are more likely to be endorsed, that people differ both in their inclination to endorse undesirable items and in their inclination to acquiesce to any item, and that these individual differences are general response sets which transfer across different inventories.

An interesting line of development has been to seek better understanding of the nature and magnitude of the desirability response set. Thus, Messick (1960) performed a factor analysis of the desirability ratings that subjects gave to 42 statements from the *EPPS*. Nine oblique factors were identified, their intercorrelations being low enough to indicate the absence of a second-order general desirability factor. The largest of the nine factors was described as achievement orientation (or "Protestant ethic"). Pointing out that studies of the relationship between social-desirability values and the probability of endorsement of items generally used group averages as the basis for calculation, Taylor (1959) computed the correlation between these two variables for *MMPI* items on both a group and an individual basis and suggested that the effect of item desirability on the individual examinee's responses may not be as great as has been generally supposed.

Efforts were also made to achieve a clearer understanding of the acquiescence response set. Couch and Keniston (1960) developed a 360-item scale measuring the tendency to agree with items and found that

its scores were significantly correlated with various personality-test scores. The authors subsequently presented evidence that scores on their scale were largely independent of the social-desirability set (Couch and Keniston, 1961).

Various methods have been devised to control or correct for response sets and efforts to distort responses. Several recent studies investigated such factors. Wiggins (1959) administered the *MMPI* to a control group under standard conditions and to an experimental group under instructions to give socially desirable responses. He then scored the *MMPI* on various scales devised to correct for such influences. He concluded that the scales that were most effective in differentiating between the two groups were those empirically derived to detect dissimulators and that rational scales were less effective. Hanley (1961) reinterpreted Wiggins' results and appropriately pointed out that the scales which discriminated best were typically those which employed both empirical and rational considerations in their construction. In any event, the study did reconfirm that this type of distortion is detectable to some extent by well-designed scales.

Two types of scales sometimes used to detect faking on inventories are suppressor and obvious-subtle scales; Gray (1959) showed that a combination of both types was effective for discriminating between false and true scores on the Physician scale of the *SVIB*. Both Buss (1959) and Hanley (1959) showed that the operation of response sets is affected by the wording and style of items, suggesting another approach to the diminution of such effects.

Finally, mention should be made of an aspect of test response which may be regarded as a type of response set—the tendency to respond in an atypical or deviant fashion. The significance of this tendency was investigated by Grigg and Thorpe (1960). After the response frequencies of college freshmen to items of Gough's Adjective Check List were established, the list was readministered to a new sample; significantly more deviant responses were given by those freshmen who later became psychiatric or personal-counseling cases than by those who did not.

Trends and Needs

While the literature of the past three years had its share of pedestrian studies of the obvious or trivial, there were also trends that deserve further emphasis and development. It was a pleasure to note that many investigators were continuing to address efforts toward further specifying the concurrent and predictive validities of well-established instruments against external criteria of performance. But, whereas criteria of individual or social pathology were being vigorously studied, criteria of performance in educational, vocational, and social settings were still receiving too little attention.

A particularly worthwhile trend was the shift away from outright empiricism toward integrative concepts and theory. One manifestation of this was the greater attention given to investigating networks of relationships in order to improve definition of the constructs measured by various tests. Factor analysis, of course, constitutes a standard method of doing this; it was heartening to see more of such analyses of various scales and their component items and, especially, increasing attention to the verification of such factors and to the pursuit of their behavioral correlates and implications. Also directed along these lines were the numerous studies of the construct validity of tests and scales, including some in which test performance was traced back to antecedent experiences or experimental manipulations, as in programs of education or training; examples are studies by Caditz (1958), Costin (1960), and Lohmann, Zenger, and Weschler (1959). A further indication of this integrative trend was the use of personality measures to test theories of personality. There was also more attention given to constructing new tests and scales on the basis of theoretical frameworks.

The problem of response sets and distortion continues to sap the validity of structured tests of personality. Though more has been learned about the nature and operation of such factors, methods that will control them better are still needed.

Current lines of development should, hopefully, lead to increased ability to devise more valid tests and to use them in ways that are more valid.

Bibliography

- ALPERT, RICHARD, and HABER, RALPH NORMAN. "Anxiety in Academic Achievement Situations." *Journal of Abnormal and Social Psychology* 61: 207-15; September 1960.
- ASH, PHILIP. "Validity Information Exchange, No. 13-05: D.O.T. Code: 1-86.12, Salesman, Typewriters." *Personnel Psychology* 13: 454; Winter 1960.
- ATKINSON, JOHN W., and LITWIN, GEORGE H. "Achievement Motive and Test Anxiety Conceived as Motive To Approach Success and Motive To Avoid Failure." *Journal of Abnormal and Social Psychology* 60: 52-63; January 1960.
- BENDIG, A. W. "Extroversion, Neuroticism, Radicalism, and Tendermindedness." *Journal of Consulting Psychology* 22: 292; August 1958.
- BENDIG, A. W. "Age Differences in the Interscale Factor Structure of the Guilford-Zimmerman Temperament Survey." *Journal of Consulting Psychology* 24: 134-38; April 1960. (a)
- BENDIG, A. W. "Factor Analyses of 'Anxiety' and 'Neuroticism' Inventories." *Journal of Consulting Psychology* 24: 161-68; April 1960. (b)
- BINDER, ARNOLD. "Personality Variables and Recognition Response Level." *Journal of Abnormal and Social Psychology* 57: 136-42; September 1958.
- BORG, WALTER R. "Prediction of Small Group Role Behavior from Personality Variables." *Journal of Abnormal and Social Psychology* 60: 112-16; January 1960.
- BOYD, J. B. "Interests of Engineers Related to Turnover, Selection, and Management." *Journal of Applied Psychology* 45: 143-49; June 1961.
- BUSS, ARNOLD H. "The Effect of Item Style on Social Desirability and Frequency of Endorsement." *Journal of Consulting Psychology* 23: 510-13; December 1959.
- CADITZ, SYLVAN BERNARD. *The Effect of a Training School Experience on Delinquent Boys as Measured by Objective Personality Tests*. Doctor's thesis. Seattle: University of Washington, 1958. 68 p. Abstract: *Dissertation Abstracts* 19: 1812-13; No. 7, 1959.
- CARON, ALBERT J., and WALLACH, MICHAEL A. "Personality Determinants of Repressive and Obsessive Reactions to Failure-Stress." *Journal of Abnormal and Social Psychology* 59: 236-45; September 1959.

- CATTELL, RAYMOND B.; BELOFF, HALLA; and COAN, RICHARD W. *IPAT High School Personality Questionnaire (H.S.P.Q.)*. Champaign, Ill.: Institute for Personality and Ability Testing, 1958.
- COMREY, ANDREW L. "A Factor Analysis of Items on the F Scale of the MMPI." *Educational and Psychological Measurement* 18: 621-32; Autumn 1958. (a)
- COMREY, ANDREW L. "A Factor Analysis of Items on the K Scale of the MMPI." *Educational and Psychological Measurement* 18: 633-39; Autumn 1958. (b)
- COMREY, ANDREW L., and SOUFI, ALLADIN. "Further Investigation of Some Factors Found in MMPI Items." *Educational and Psychological Measurement* 20: 777-86; Winter 1960.
- COMREY, ANDREW L., and SOUFI, ALLADIN. "Attempted Verification of Certain Personality Factors." *Educational and Psychological Measurement* 21: 113-27; Spring 1961.
- COSTIN, FRANK. "Measuring Attitudinal Outcomes of Child Psychology with the Parental Attitude Research Instrument." *Journal of Educational Research* 53: 289-94; April 1960.
- COUCH, ARTHUR, and KENISTON, KENNETH. "Yeasayers and Naysayers: Agreeing Response Set as a Personality Variable." *Journal of Abnormal and Social Psychology* 60: 151-74; March 1960.
- COUCH, ARTHUR, and KENISTON, KENNETH. "Agreeing Response Set and Social Desirability." *Journal of Abnormal and Social Psychology* 62: 175-79; January 1961.
- DAVIDS, ANTHONY; DEVAULT, SPENCER; and TALMADGE, MAX. "Anxiety, Pregnancy, and Childbirth Abnormalities." *Journal of Consulting Psychology* 25: 74-77; February 1961.
- DAY, HARRY P. "A Study of Predictive Validity of the Minnesota Teacher Attitude Inventory." *Journal of Educational Research* 53: 37-38; September 1959.
- DEMOS, GEORGE D., and SPOLYAR, LUDWIG J. "Academic Achievement of College Freshmen in Relation to the Edwards Personal Preference Schedule." *Educational and Psychological Measurement* 21: 473-79; Summer 1961.
- EYSENCK, H. J. "Hysteries and Dysthymics as Criterion Groups in the Study of Introversio-Extroversio: A Reply." *Journal of Abnormal and Social Psychology* 57: 250-52; September 1958.
- EYSENCK, H. J. "Personality and Social Attitudes." *Journal of Social Psychology* 53: 243-48; April 1961.
- GARDNER, ERIC F., and THOMPSON, GEORGE G. *Syracuse Scales of Social Relations*. New York: World Book Co., 1959.
- GISVOLD, DARRELL. "A Validity Study of the Autonomy and Deference Subscales of the EPPS." *Journal of Consulting Psychology* 22: 445-47; December 1958.
- GRAY, CLIFTON WELLINGTON. *Detection of Faking in Vocational Interest Measurement*. Doctor's thesis. Minneapolis: University of Minnesota, 1959. 325 p. Abstract: *Dissertation Abstracts* 20: 1429; No. 4, 1959.
- GRIGG, AUSTIN E., and THORPE, JOSEPH S. "Deviant Responses in College Adjustment Clients: A Test of Berg's Deviation Hypothesis." *Journal of Consulting Psychology* 24: 92-94; February 1960.
- GROSZ, HANUS J., and LEVITT, EUGENE E. "The Effects of Hypnotically Induced Anxiety on the Manifest Anxiety Scale and the Barron Ego-Strength Scale." *Journal of Abnormal and Social Psychology* 59: 281-83; September 1959.
- HANLEY, CHARLES. "Responses to the Wording of Personality Test Items." *Journal of Consulting Psychology* 23: 261-65; June 1959.
- HANLEY, CHARLES. "Social Desirability and Response Bias in the MMPI." *Journal of Consulting Psychology* 25: 13-20; February 1961.
- HOLLAND, JOHN L. "The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Test." *Journal of Educational Psychology* 50: 135-42; August 1959.
- ISCOE, IRA, and COCHRAN, IRENÉ. "Some Correlates of Manifest Anxiety in Children." *Journal of Consulting Psychology* 24: 97; February 1960.
- IZARD, CARROLL E. "Personality Characteristics Associated with Resistance to Change." *Journal of Consulting Psychology* 24: 437-40; October 1960.
- JENKINS, THOMAS N. *How Well Do You Know Yourself?* Form NE-21. New York: Executive Analysis Corporation, 1959.
- KARSON, SAMUEL. "The Sixteen Personality Factor Test in Clinical Practice." *Journal of Clinical Psychology* 15: 174-76; April 1959.

- KARSON, SAMUEL, and POOL, KENNETH B. "Second-Order Factors in Personality Measurement." *Journal of Consulting Psychology* 22: 299-303; August 1958.
- KASSEBAUM, GENE G.; COUCH, ARTHUR S.; and SLATER, PHILIP E. "The Factorial Dimensions of the MMPI." *Journal of Consulting Psychology* 23: 226-36; June 1959.
- KITANO, HARRY H. L. "Validity of the Children's Manifest Anxiety Scale and the Modified Revised California Inventory." *Child Development* 31: 67-72; March 1960.
- KRUG, ROBERT E. "Over- and Underachievement and the Edwards Personal Preference Schedule." *Journal of Applied Psychology* 43: 133-36; April 1959.
- L'ABATE, LUCIANO. "Personality Correlates of Manifest Anxiety in Children." *Journal of Consulting Psychology* 24: 342-48; August 1960.
- LAUTERBACH, CARL G. "The Taylor A Scale and Clinical Measures of Anxiety." *Journal of Consulting Psychology* 22: 314; August 1959.
- LEVONIAN, EDWARD, and OTHERS. "A Statistical Evaluation of Edwards Personal Preference Schedule." *Journal of Applied Psychology* 43: 355-59; December 1959.
- LINGOES, JAMES C. "MMPI Factors of the Harris and the Wiener Subscales." *Journal of Consulting Psychology* 24: 74-83; February 1960.
- LOHMANN, KAJ; ZENGER, JOHN H.; and WESCHLER, IRVING R. "Some Perceptual Changes During Sensitivity Training." *Journal of Educational Research* 53: 28-31; September 1959.
- MADOFF, JEFF M. "The Attitudes of Mothers of Juvenile Delinquents Toward Child Rearing." *Journal of Consulting Psychology* 23: 518-20; December 1959.
- MAHONE, CHARLES H. "Fear of Failure and Unrealistic Vocational Aspiration." *Journal of Abnormal and Social Psychology* 60: 253-61; March 1960.
- MAHONEY, THOMAS A.; JERDEE, THOMAS H.; and NASH, ALLAN N. "Predicting Managerial Effectiveness." *Personnel Psychology* 13: 147-63; Summer 1960.
- MEEHL, PAUL E., and DAHLSTROM, W. GRANT. "Objective Configurational Rules for Discriminating Psychotic from Neurotic MMPI Profiles." *Journal of Consulting Psychology* 24: 375-87; October 1960.
- MESSICK, SAMUEL. "Dimensions of Social Desirability." *Journal of Consulting Psychology* 24: 279-87; August 1960.
- MITCHELL, JAMES V., JR., and PIERCE-JONES, JOHN. "A Factor Analysis of Gough's California Psychological Inventory." *Journal of Consulting Psychology* 24: 453-56; October 1960.
- O'CONNOR, JAMES P., and STEFIC, EDWARD C. "Some Patterns of Hypochondriasis." *Educational and Psychological Measurement* 19: 363-71; Autumn 1959.
- PETERSON, DONALD R.; QUAY, HERBERT C.; and ANDERSON, ARTHUR C. "Extending the Construct Validity of a Socialized Scale." *Journal of Consulting Psychology* 23: 182; April 1959.
- POPHAM, W. JAMES, and TRIMBLE, ROBERT R. "The Minnesota Teacher Attitude Inventory as an Index of General Teaching Competence." *Educational and Psychological Measurement* 20: 509-12; Autumn 1960.
- SCHAEFER, EARL S., and BELL, RICHARD Q. "Development of a Parental Attitude Research Instrument." *Child Development* 29: 339-61; September 1958.
- SCHUTZ, WILLIAM C. *FIRO: A Three-Dimensional Theory of Interpersonal Behavior*. New York: Rinehart and Co., 1958. 267 p.
- SIGAL, JOHN J.; STAR, KOLMAN H.; and FRANKS, CYRIL M. "Hysterics and Dysthymics as Criterion Groups in the Study of Introversion-Extroversion." *Journal of Abnormal and Social Psychology* 57: 143-48; September 1958.
- STANDLEE, LLOYD S., and POPHAM, W. JAMES. "The MTAI as a Predictor of Over-All Teacher Effectiveness." *Journal of Educational Research* 52: 319-20; April 1959.
- TAYLOR, JAMES BENTLEY. "Social Desirability and MMPI Performance: The Individual Case." *Journal of Consulting Psychology* 23: 514-17; December 1959.
- TAYLOR, JANET A., and RECHTSCHAFFEN, ALLAN. "Manifest Anxiety and Reversed Alphabet Printing." *Journal of Abnormal and Social Psychology* 58: 221-24; March 1959.
- TERWILLIGER, JAMES S., and FIEDLER, FRED E. "An Investigation of Determinants Inducing Individuals To Seek Personal Counseling." *Journal of Consulting Psychology* 22: 288; August 1958.
- WAGNER, EDWIN E. "Predicting Success for Young Executives from Objective Test Scores and Personal Data." *Personnel Psychology* 13: 181-86; Summer 1960.
- WEISS, PETER; WERTHEIMER, MICHAEL; and GROESBECK, BYRON. "Achievement Motivation, Academic Aptitude, and College Grades." *Educational and Psychological Measurement* 19: 663-66; Winter 1959.

- WIGGINS, JERRY S. "Interrelationships Among MMPI Measures of Dissimulation Under Standard and Social Desirability Instructions." *Journal of Consulting Psychology* 23: 419-27; October 1959.
- WILLINGHAM, WARREN W.; NELSON, PAUL; and O'CONNOR, WILLIAM. "A Note on the Behavioral Validity of the Gordon Personal Profile." *Journal of Consulting Psychology* 22: 378; October 1958.
- WILSON, JOHN E. "Evaluating a Four Year Sales Selection Program." *Personnel Psychology* 12: 97-104; Spring 1959.
- WITHERSPOON, PAUL, and MELBERG, M. E. "Relationship Between Grade-Point Averages and Sectional Scores of the Guilford-Zimmerman Temperament Survey." *Educational and Psychological Measurement* 19: 673-74; Winter 1959.
- WORELL, LEONARD. "EPPS n Achievement and Verbal Paired-Associates Learning." *Journal of Abnormal and Social Psychology* 60: 147-50; January 1960.
- ZUCKERMAN, MARVIN. "The Validity of the Edwards Personal Preference Schedule in the Measurement of Dependency-Rebelliousness." *Journal of Clinical Psychology* 14: 379-82; October 1958.

CHAPTER VI

Development and Application of Projective Tests of Personality

HENRY RICCIUTI

THIS CHAPTER will identify and appraise some of the significant developments in projective testing during the period under review. Following a short summary of important books and general articles, the discussion will focus upon the following: (a) major theoretical and methodological trends, (b) new approaches in the development or use of projective techniques, and (c) representative findings of validity and predictive studies. Because of the need to be selective, attention has been directed primarily to projective methods that are currently or potentially amenable to use as quantitative instruments and to techniques whose potential value is not limited to the study of psychopathology.

New Books and General Articles

An interesting paper, which should be particularly helpful to those who may be seriously approaching projective testing for the first time, was Lindzey's (1959) systematic classification of the great variety of projective techniques. He also attempted to compare and contrast these different approaches on important test properties. Henry's (1960) review and discussion were extremely valuable for the reader interested in the use of projective techniques as research tools in studies of psychological development. For the many investigators interested in the *Thematic Apperception Test (TAT)* and its modifications, the compilation by Lindzey and others (1959) appeared extremely valuable; it summarized a large number of published interpretive statements relating particular test responses to various characteristics of the examinee and provided references to the relevant theoretical or empirical studies upon which the statements are based.

Two books were particularly important, since they clearly reflected the increasingly systematic efforts directed toward some of the still-unsolved basic theoretical and methodological problems. Atkinson (1958) brought together a large number of separate studies, many reported for the first time, representing approximately a decade of research on the achievement, power, and affiliation motives as assessed through thematic-apperception methods. This collection of papers was noteworthy, since it was essentially the first systematic attempt to develop projective methods specifically for the assessment of particular motives and to validate such methods in the

context of research aimed principally toward the development of a theory of motivation. In addition to a large number of construct-validity studies, the book reported a variety of methodological investigations of the measuring instruments employed and presented detailed scoring manuals and technical suggestions for those concerned with the development and research use of thematic-apperception techniques.

A more recent collection of papers, edited by Kagan and Lesser (1961), also reflected the increasingly vigorous and sophisticated approach to theoretical and methodological issues in thematic-apperception techniques. The book also contained a number of conference papers that presented provocative discussions of central problems.

Additional References: Ames, Métraux, and Walker (1959); Forer and others (1961); Ledwith (1959); Rabin and Haworth (1960); Schneidman and others (1959).

Major Theoretical and Methodological Trends

Increasing concern about basic theoretical and methodological issues and increasing sophistication of studies were the major important and encouraging trends in projective testing during the period under review. Apparently, investigators believed that projective tests of personality having high construct validity and reliability cannot be developed unless a theory of projective response behavior is simultaneously developed. Such a theory must take into account such issues as the relation between motive strength and projective-test responses, the relation between each of these and overt behavior, the role played by the projective stimulus itself, the effect of instructions, the set, and situational factors.

Despite this encouraging trend, two familiar, generally unfruitful approaches to projective testing were still apparent. First, projective techniques continued to be used with subjective, global interpretations in a manner that makes it difficult to evaluate and develop the techniques further as measuring instruments. Second, quantitatively oriented test-users frequently seemed to employ almost any objectively scorable projective technique in a battery of tests, in an uncritical and theoretical manner, in the hope of predicting a socially important criterion. The research reviewed here indicates that both of these approaches will continue to be unfruitful and that real progress in projective testing will take place only as the theoretical and methodological issues previously mentioned are contended with successfully.

Theoretical Considerations and the Problem of Construct Validity

Much of the recent thinking and research on these issues has dealt specifically with thematic-apperception methods. Since these techniques are so often concerned with the appraisal of motive strength, the basic issue

here is how need states or motives are reflected in the stories told by subjects. Probably the most systematic attempt to spell out such a theory as a basis for projective-test construction and validation was found in the extensive research on the achievement, affiliation, and power motives described by Atkinson (1958). Although there is good evidence from this and other research that the amount of motive-related imagery increases with increasing motive strength, the matter is not that simple. Lazarus (1961) presented considerable evidence that, at least for some motives, motive-related imagery occurring in apperceptive fantasy may increase to a certain point with increasing motive strength, but may decrease as motive strength reaches very high levels. Also, when motives of even medium intensity arouse conflict and anxiety, manifest imagery related to these motives may be inhibited and, consequently, not appear in subjects' stories. Hence, it becomes necessary to develop techniques to be used jointly with measures of motive strength for identifying conflict or inhibiting anxiety (Feshback, 1961; Bronfenbrenner and Ricciuti, 1960). Thus, the complexity of the relationships between a given motive strength and the kinds of overt behavior that are so often predicted indicate the need for extensive theory-based research in the development and predictive use of sound projective-testing techniques.

On the question of optimal strategies for the design of empirical validity studies, a recent paper by Campbell and Fiske (1959) held particularly relevant implications for projective-test validation. Since, as their review of the available literature on the subject shows, there is often an appreciable degree of variance in common "methods" or "apparatus" between measures of ostensibly different traits, and since it is important to obtain evidence of "discriminant validation" (low correlations with tests that are presumed to measure different traits), Campbell and Fiske recommend that validity studies be designed to permit the comparison of at least two different traits, each measured by at least two different methods. Thus, two different measures of the same trait should have higher correlation (convergent validity) than would different measures of different traits; also, the convergent validity should be higher than the correlation between two different traits measured by the same method.

This design was employed in a later study by Maher, Watt, and Campbell (1960), in which a sentence-completion test and a questionnaire were constructed to measure two presumably different attitudes: attitudes "toward home and parents" and those "toward law and justice." Working with a prison population, the authors found cross-method validities reasonably high for both attitudes (.51, .50), while the cross-trait correlations were very close to zero both within similar methods and across methods. Patterns of correlations like these are not easily obtained, however. Van Buskirk (1961) constructed two projective methods and one questionnaire method for measuring anxiety in order to study its effect on complex reasoning, and found generally very low correlations among all three measures. It is not always reasonable to expect high relationships between

fantasy measures and more direct measures such as questionnaires; nevertheless, the correlations of cross-method measures of the same trait need to be systematically investigated.

Several recent studies have been concerned with the relation between projective and more direct measures of given traits. Although the designs have not often permitted the kind of systematic comparisons suggested by Campbell and Fiske, such comparisons would have made the studies more meaningful and indisputable. A study by Calogeras (1958) is an example. He found rather encouraging correlations, mainly .20 to .50, between *TAT* measures of five "intrafamilial attitudes" in tenth-grade boys and direct-questionnaire, indirect-questionnaire, and interview measures of the same attitudes. Correlations among different attitudes obtained with each method of measurement and cross-method correlations between different attitudes also obtained with each method of measurement would have strengthened the study.

The relationships between projective and direct measures of the same characteristics were found to vary with the sex of the subjects (Bieri, Lobeck, and Galinsky, 1959) and with the set or motivational conditions of the testing situation. For example, in a study by Raphelson and Moulton (1958), a questionnaire measure of test anxiety and projective indicators of fear of failure correlated positively under low-anxiety conditions, but correlated negatively under anxiety-arousing conditions. Similarly, Davids and Pildner (1958) reported that intercorrelations between projective and objective tests of maladjustment were higher for students tested under optimal conditions of rapport and motivation to respond honestly than were intercorrelations for students tested in a personnel-selection situation. It seems that it would often be desirable to employ projective and more direct personality measures jointly in the same research.

An encouraging trend found in some validity studies of the Rorschach test was the interest being shown in the empirical validation of interpretive hypotheses specific to particular Rorschach scoring categories. Two experimental studies by Levine, Spivack, and Wight (1959) and Neel (1960) yielded evidence, which was generally consistent with the Rorschach interpretations, that movement responses reveal capacity to inhibit impulses. In another study by Waller (1960b), no relationship was found between Rorschach shading responses and two questionnaire measures of anxiety in psychiatric patients.

Additional Reference: Henry and Farley (1959).

Role of Situational Factors

There has been continuing concern for the degree to which projective responses may be influenced by such nonpersonality factors as set, instructions, method of administration, and similar situational variables. An excellent critical review of studies that dealt with these questions through 1958 was contained in Masling's (1960) paper, which concluded that

such effects are appreciable and require careful analysis. Studies by Lubin (1960, 1961) revealed that college students tested with instructions emphasizing individuality and spontaneity produced more sexual, aggressive, and creative expressions on the *TAT* than did students tested under instructions emphasizing constraint and inhibition. Clinical psychologists found indications of greater maladjustment in stories told by the students under the facilitating instructions. Davids and Pildner (1958) found that college students given objective personality tests in an employment situation showed less maladjustment than did a control group; this was not true for clinically rated projective tests, which presumably were less subject to favorable distortion.

Lindzey and Silverman's (1959) systematic study of the comparability of *TAT* results obtained under group-administration and individual-administration conditions revealed no differences between the conditions for 12 of the scores employed, including achievement, affiliation, and dominance. For 6 of the characteristics (excluding the 3 just mentioned), however, women college students made higher scores under individual than under group conditions, while the reverse was true for men students.

Additional References: Le Noue (1961); Mausner (1961); Reznikoff (1961).

Reliability and Stability of Projective Measures

The problem of response variability over presumably equivalent test stimuli and over time has been a formidable one in projective testing, and it warrants more research than is currently being devoted to it. According to Atkinson (1958), with certain thematic-apperception measures designed to assess particular motives, such as need to achieve, it was possible to obtain relatively good, but not outstanding, equivalent-form reliabilities over a period of several weeks. Estimated correlations were .70 for 12 pictures. Split-half reliabilities of approximately the same magnitude have been obtained with these techniques. On the other hand, Himelstein and Kimbrough (1960) found that measures of achievement motivation based on verbal explanations of the behavior of fictitious characters yielded seven-week test-retest correlations of .37 and .44, although the situation was somewhat better for measures of affiliation motivation (.62, .70).

When themes in eight need areas and press areas were examined by Kagan (1959) in the *TAT* protocols of children tested serially at ages 8, 11, and 14, only physical-aggression and achievement themes, in three of six possible comparisons, showed significant but low stabilities over time. (The highest phi coefficient was .34.) Although the need measures were relatively crude and the cards were not designed for optimal assessment of particular needs, these results seem fairly discouraging.

As Fiske (1959) pointed out in his helpful review, although the actual content of projective responses varies considerably over time, some scores and ratings are reasonably stable. Nevertheless, the problem of response

variability, whether due to trait fluctuation or to measurement error, still remains a serious obstacle to further development and application of projective-measurement procedures.

Additional References: Ames (1960a, b); Fisher (1958).

Role of Stimulus Properties

During the period under review, there was a continuation of research for more precise identification of important characteristics of projective-test stimuli and of their influence on test responses and validity.

One aspect of thematic pictures that probably has been of greatest concern to researchers is the ambiguity of their content, or the extent to which pictures suggest imagery pertinent to the motive or trait to be measured. Atkinson (1958, Chapters 43-46) reported that investigators involved in the development of projective measures of achievement motivation have been giving this question much attention. Kenny (1961) and Murstein (1960, 1961) made strong pleas for more systematic and precise evaluations of stimulus ambiguity and suggested techniques for achieving this goal. For a number of years, the older assumption that projective pictures should be highly ambiguous has been questioned on the basis of studies that showed that moderately or highly structured pictures tend to yield more valid measures of particular motives than do highly ambiguous ones. Consistent with this view is Murray's (1959) finding that sleep-deprived subjects were better differentiated from non-sleep-deprived subjects by pictures suggesting sleep than by more ambiguous pictures. The situation becomes complex with very highly structured pictures, since for some motives and some subjects such pictures may inhibit motive-related imagery (Feshback, 1961). The basic problem remains that of the interactive effects of motive strength, stimulus-cue value, and inhibitory controls on test response; this problem must be solved if apperception techniques of high validity are to be developed.

Of considerable interest was Budoff's (1960) study of the effectiveness of animal *versus* human figures in the use of thematic cards with children. His results, which confirm other recent findings that preschool children do not respond any better to animal figures than to human ones, thus question a widely held contrary assumption.

Additional References: Little (1959); Schleifer and Hire (1960).

Attempts To Increase Objectivity and Reliability of Measurement

In the interest of improving the objectivity and precision of such projective measures of motivation as thematic procedures, Lesser (1958, 1961) and Murstein (1961) suggested that stimuli intended to elicit imagery appropriate only to a particular motive be developed and empirically scaled for ambiguity, with the intent of producing a unidimensional measure. Although there was considerable opinion, shared by Little

(1959) and by this reviewer, that projective stimuli should be designed and/or selected specifically to provide optimal measures of particular personality variables, it remains to be seen whether or not unidimensional scaling can be achieved at the same time as maximum validity. Lesser (1958) and Murstein reported some success in Guttman scaling of pictures for aggressive content.

Two interesting modifications of the Rorschach techniques sought greater objectivity in scoring and interpretation. To increase the precision of the Rorschach inquiry following subjects' free responses, Baughman (1959) developed a procedure for verifying the role of particular blot determinants of subjects' percepts in which the testee was presented specially prepared cards from which a particular determinant had been eliminated and asked if the percept was still seen. In a subsequent study, Waller (1960a) found that differences between psychiatric patients and nonpatients in shading responses were presumably indicative of anxiety only when Baughman's inquiry method, and not the standard technique, was used. In another investigation by Waller (1960b), however, shading of responses identified by both inquiry methods failed to produce correlations with questionnaire measures of anxiety.

Holtzman (1958), also in the interest of increasing the objectivity of inkblot procedures, developed a new inkblot technique using 45 cards instead of the usual 10; the subjects were allowed to give only one response per card, so that wide variation in subjects' total number of responses was eliminated. A detailed scoring guide facilitated reliability of scoring.

Additional Reference: Holtzman (1959).

New Tests and Approaches

Holtzman's recently published *Inkblot Test*, described above, appeared to be an interesting innovation that will bear watching as studies of its validity accumulate. Two parallel forms of the test are based on a variety of normal and pathological subject groups.

Another newly published instrument, the *Group Personality Projective Test* of Cassel and Kahn (1958), consists of 90 stick-figure drawings, each accompanied by five multiple-choice statements; the testee checks the statement most descriptive of the picture. In this very brief and ambiguous journal article on its development and standardization, the test was described as measuring 15 personality needs. There was no indication of the theoretical rationale of these measures, which were reduced on the basis of factor analysis to five or six scores, plus a seventh "total personality needs" score that reflected over-all mental health. The principal evidence of validity was the distinguishing, by this over-all score, between Air Force preflight cadets and federal-reformatory prisoners and between "typical young adults" and "neuropsychiatric patients." A subsequent study with this instrument by Cassel and Brauchle (1959) suggested that it is

possible for subjects to distort responses in an unfavorable direction, but that it is more difficult to fake a favorable personality picture. Progress in projective testing is not facilitated by the commercial publication of instruments that show so little evidence of a systematic theoretical basis for their development and so little evidence of construct validity, particularly for subscores.

An extremely interesting new approach to the assessment of defense mechanisms through apperceptive methods was reported by Kragh (1960). A pictorial stimulus is presented to groups of subjects in a series of 12 brief, gradually increasing exposures of from 20 to 500 milliseconds. After each exposure, the subject is asked to draw, and write comments about, what he has seen. On the basis of what is seen and not seen by the subject, inferences are made about the nature and intensity of his defense mechanisms. Defensive or repressive responses that persist under longer exposure times are given more weight than those that appear only with the briefest exposures. Kragh used this method for predicting the success of Swedish aviation cadets in pilot training, by making over-all predictive ratings from an evaluation of the number and intensity of defense mechanisms shown in the test protocols. His predictive ratings showed promising validities against pass-fail criteria; biserial correlations were typically between .31 and .66. But the predictive ratings of colleagues using the same test data were considerably lower; biserial correlations were from -.03 to .33. This seems to be a promising approach and warrants further refinement and validation studies.

Another provocative development was Pine and Holt's (1960) attempt to evaluate from Rorschach protocols the role of primitive, nonlogical, drive-dominated modes of thinking in behavior ("primary process"). A detailed scoring procedure permits reliable indexing of the amount of primary process or drive present as well as of effectiveness or adaptiveness of controls over primary-process expression. In a study of creativity, Pine and Holt found promising relationships (for college men, not college women) between strong but adaptively controlled primary process and such independent measures of creativity as literary quality of *TAT* stories (.83), Brick Uses Flexibility (.48), and the Consequences Test of Originality (.74). Two other efforts by Pine (1959, 1960) to derive similar evaluations of drive content from *TAT* protocols did not produce such promising results.

Some Representative Findings of Validity and Predictive Studies

There probably has been a more intensive output of construct-validity studies of thematic measures of need for achievement than of any other single projective instrument and its variants. On the whole, studies appear

ing since Atkinson's compilation seemed to reveal the same pattern of findings that characterized the earlier research. For the most part, considerable support for the construct validity of the need-for-achievement measures and their modifications was provided by the theoretically meaningful relationships obtained with a considerable variety of relevant variables, particularly in carefully controlled studies where the design permitted analyses of relatively complex interrelationships (Atkinson and Litwin, 1960; French, 1958; Mahone, 1960; Rosen and D'Andrade, 1959). In the Atkinson and Litwin study, for example, high-need-for-achievement college males showed greatest preference for intermediate risks in a competitive laboratory game, as predicted, and worked longer on their final examination. This study also suggested that more precise predictions of behavior are likely to be possible when independent measures of motivation to approach success (need for achievement) and of motivation to avoid failure (test anxiety) are utilized jointly.

Considerably less consistent success was experienced in attempts by Bendig (1958) and by Weiss, Wertheimer, and Groesbeck (1959) to make predictions of such "practical" global criteria as college grades, an accomplishment that should not be expected under all circumstances for this instrument in the first place, according to Atkinson (1958). One of the main difficulties with the need-for-achievement measures was that there was still considerable ambiguity concerning the conceptual meaning of the test-score continuum. Sometimes the scores were seen as unidimensional measures of striving for success, as by Atkinson and Litwin; at other times they were seen as complex measures representing the interaction of hope-of-success and fear-of-failure motives (Reitman, 1961).

The feasibility of employing thematic procedures to assess motivation in interview surveys of a large portion of the general population was explored by Veroff and others (1960). These investigators attempted to secure exploratory measures of affiliation, achievement, and power motivation with a six-picture test presented by interviewers who conducted a nationwide interview survey of mental health. Their report presented an incisive appraisal of the methodological and conceptual problems they met, such as interviewer bias and equivalence of picture stimuli for subjects at different educational and age levels. They concluded that, with further methodological refinement, projective techniques of this sort have a potential contribution to make in large-scale survey studies.

Projective techniques of various types continued to be used often to predict a variety of practical industrial or educational criteria, but, with few exceptions, the results were not promising. An exploratory study by Eilbert and Glaser (1959) of the value of the incomplete-sentence technique for predicting adjustment of Air Force personnel assigned to isolated arctic stations yielded generally encouraging results. The items were selected in the light of the objective of the study and were scored on the basis of whether they seemed consistent with good, indeterminate, or poor adjustment. Although, as the authors pointed out, the study represents concurrent

validation for the instrument, it may also prove valuable as a predictive screening device.

Koenig and McKeachie (1959), in a study of relationships between personality characteristics and response to different teaching methods, did not obtain the predicted results—that college students high in projectively measured power and affiliation motivation would prefer small-group discussions and would perform better in the course. Highly independent students did not perform better, nor were they better satisfied. The prediction that subjects high in need to achieve would prefer and do better in independent study was not verified for men, but there were significant findings for women. This report contained no information on the reliability of scoring the projective measures or on the picture stimuli used.

Mayo and Manning (1961) employed two objectively scored projective measures of motivation in a battery of tests to predict grades in an aviation-mechanics training course, statistically removing the effect of aptitude. The combined projective measures had the lowest correlations of all the predictors, clustering very close to zero. In another investigation, Sanders, Mefferd, and Bown (1960) administered a large variety of tests that included the Holtzman *Inkblot Test* in an effort to find personality characteristics that differentiate students with large and small discrepancies between verbal and quantitative abilities. Only 1 of the 16 *Inkblot Test* scores showed a significant relationship to the criterion. Sheldon, Coale, and Copple (1959) employed a 10-card objectively scored thematic-apperception measure of six personality needs, with a variety of other tests, in an investigation of personality differences between college freshmen who scored high and low (10 at each extreme) on a measure of personal "warmth" of teachers. The "warm teacher" group was significantly higher on need for affiliation and significantly lower on need for succorance than the "cold teacher" group on both thematic and questionnaire measures of these needs. Results with respect to other needs were insignificant or inconsistent.

The three studies summarized in the preceding paragraph illustrate what this reviewer has previously described as uncritical, atheoretical, and generally unfruitful application of projective techniques. In the first two studies, no rationale was given for selecting the particular projective techniques employed, and, in the third study, although the variables measured seem reasonable, the investigators hypothesized merely that there would be relationships with the criterion and did not attempt to indicate the expected direction of such relationships. Also, an atypical variant of the *TAT* was used, with no question about its equivalence to previously validated apperceptive measures. The negative results of such studies are not as discouraging as the fact that because of these studies' atheoretical designs, the negative results cannot provide a fruitful basis for further development of the techniques, or even for more judicious choice of predictors in future studies of this kind.

Additional Reference: Miner (1960).

Conclusion

The practical usefulness of projective techniques in predicting educational or industrial criteria continues to be small. Projective techniques are also of little potential value in educational research if they are used indiscriminately and with little awareness of the complex ways in which various factors, both desirable and undesirable, may influence test responses. However, there is a place for projective methods in educational research when they are used in combination with other techniques in studies designed within a theoretical framework that permits some evaluation of the construct validity of the projective technique itself. Unless projective methods can be used in such a context, they had better not be used at all.

Projective tests of high construct validity and reliability are not likely to be produced without the simultaneous development of a progressively more valid theory of projective-response behavior. The most encouraging trend observable in the past three years is the increasing amount of research being undertaken, which should contribute to the development of such a theory.

Bibliography

- ATKINSON, JOHN W., editor. *Motives in Fantasy, Action, and Society*. Princeton, N.J.: D. Van Nostrand Co., 1958. 873 p.
- ATKINSON, JOHN W., and LITWIN, GEORGE H. "Achievement Motive and Test Anxiety Concealed as Motive To Approach Success and Motive To Avoid Failure." *Journal of Abnormal and Social Psychology* 60: 52-63; January 1960.
- BAUCHMAN, E. EARL. "The Effect of Inquiry Method on Rorschach Color and Shading Scores." *Journal of Projective Techniques* 23: 3-7; March 1959.
- BENDIG, A. W. "Predictive and Postdictive Validity of Need Achievement Measures." *Journal of Educational Research* 52: 119-20; November 1958.
- BIERI, JAMES; LOBECK, ROBIN; and GALINSKY, M. DAVID. "A Comparison of Direct, Indirect, and Fantasy Measures of Identification." *Journal of Abnormal and Social Psychology* 58: 253-58; March 1959.
- BRONFENBRENNER, URIE, and RICCIUTI, HENRY. "The Appraisal of Personality Characteristics in Children." *Handbook of Research Methods in Child Development*. (Edited by Paul H. Mussen.) New York: John Wiley & Sons, 1960. p. 770-817.
- BUDOFF, MILTON. "The Relative Utility of Animal and Human Figures in a Picture-Story Test for Young Children." *Journal of Projective Techniques* 24: 347-52; December 1960.
- CALOGERAS, ROY C. "Some Relationships Between Fantasy and Self-Report Behavior." *Genetic Psychology Monographs* 58: 273-325; November 1958.
- CAMPBELL, DONALD T., and FISKE, DONALD W. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* 56: 81-105; March 1959.
- CASSEL, RUSSELL N., and BRAUCHLE, ROBERT P. "An Assessment of the Fakability of Scores on the Group Personality Projective Test." *Journal of Genetic Psychology* 95: 239-44; December 1959.
- CASSEL, RUSSELL N., and KAHN, THEODORE C. "Development and Standardization of the Group Personality Projective Test." *Journal of Projective Techniques* 22: 267-71; September 1958.
- DAVIDS, ANTHONY, and PILDNER, HENRY, JR. *Comparison of Direct and Projective Methods of Personality Assessment Under Different Conditions of Motivation*. Psychological Monographs: Vol. 72, No. 11 (Whole No. 464), 1958. 30 p.

- EILBERT, LEO R., and GLASER, ROBERT. "Differences Between Well and Poorly Adjusted Groups in an Isolated Environment." *Journal of Applied Psychology* 43: 271-74; August 1959.
- FESHBACH, SEYMOUR. "The Influence of Drive Arousal and Conflict upon Fantasy Behavior." *Contemporary Issues in Thematic Apperceptive Methods*. (Edited by Jerome Kagan and Gerald S. Lesser.) Springfield, Ill.: C. C. Thomas, 1961. p. 119-40.
- FISKE, DONALD W. "Variability of Responses and the Stability of Scores and Interpretations of Projective Protocols." *Journal of Projective Techniques* 23: 263-67; September 1959.
- FRENCH, ELIZABETH G. "The Interaction of Achievement Motivation and Ability in Problem-Solving Success." *Journal of Abnormal and Social Psychology* 57: 306-309; November 1958.
- HENRY, WILLIAM E. "Projective Techniques." *Handbook of Research Methods in Child Development*. (Edited by Paul H. Mussen.) New York: John Wiley & Sons, 1960. p. 603-44.
- HIMELSTEIN, PHILIP, and KIMBROUGH, WILSON W., JR. "Reliability of French's 'Test of Insight.'" *Educational and Psychological Measurement* 20: 737-41; Winter 1960.
- HOLTZMAN, WAYNE H., and OTHERS. *Inkblot Perception and Personality, Holtzman Inkblot Technique*. Austin: University of Texas Press, 1958. 428 p.
- KAGAN, JEROME. "The Stability of TAT Fantasy and Stimulus Ambiguity." *Journal of Consulting Psychology* 23: 266-71; June 1959.
- KAGAN, JEROME, and LESSER, GERALD S., editors. *Contemporary Issues in Thematic Apperceptive Methods*. Springfield, Ill.: C. C. Thomas, 1961. 328 p.
- KENNY, DOUGLAS T. "A Theoretical and Research Reappraisal of Stimulus Factors in the TAT." *Contemporary Issues in Thematic Apperceptive Methods*. (Edited by Jerome Kagan and Gerald S. Lesser.) Springfield, Ill.: C. C. Thomas, 1961. p. 288-310.
- KOENIG, KATHRYN, and MCKEACHIE, WILBERT J. "Personality and Independent Study." *Journal of Educational Psychology* 50: 132-34; June 1959.
- KRACH, ULF. "The Defense Mechanism Test: A New Method for Diagnosis and Personnel Selection." *Journal of Applied Psychology* 44: 303-309; October 1960.
- LAZARUS, RICHARD S. "A Substitutive-Defensive Conception of Apperceptive Fantasy." *Contemporary Issues in Thematic Apperceptive Methods*. (Edited by Jerome Kagan and Gerald S. Lesser.) Springfield, Ill.: C. C. Thomas, 1961. p. 51-71.
- LESSER, GERALD S. "Application of Guttman's Scaling Method to Aggressive Fantasy in Children." *Educational and Psychological Measurement* 18: 543-51; Autumn 1958.
- LESSER, GERALD S. "Custom-Making Projective Tests for Research." *Journal of Projective Techniques* 25: 21-31; March 1961.
- LEVINE, MURRAY; SPIVACK, GEORGE; and WIGHT, BYRON. "The Inhibition Process, Rorschach Human Movement Responses, and Intelligence." *Journal of Consulting Psychology* 23: 306-12; August 1959.
- LINDZEY, GARDNER. "On the Classification of Projective Techniques." *Psychological Bulletin* 56: 158-68; March 1959.
- LINDZEY, GARDNER, and SILVERMAN, MORTON. "Thematic Apperception Test: Techniques of Group Administration, Sex Differences, and the Role of Verbal Productivity." *Journal of Personality* 27: 311-23; September 1959.
- LINDZEY, GARDNER, and OTHERS. *Thematic Apperception Test: An Interpretive Lexicon for Clinician and Investigator*. *Journal of Clinical Psychology*, Monograph Supplement No. 12. Brandon, Vt.: Journal of Clinical Psychology, April 1959. 98 p.
- LITTLE, KENNETH B. "Problems in the Validation of Projective Techniques." *Journal of Projective Techniques* 28: 287-90; September 1959.
- LUBIN, BERNARD. "Some Effects of Set and Stimulus Property on TAT Stories." *Journal of Projective Techniques* 24: 11-16; March 1960.
- LUBIN, BERNARD. "Judgments of Adjustment from TAT Stories as a Function of Experimentally Altered Sets." *Journal of Consulting Psychology* 25: 249-52; June 1961.
- MAHER, BRENDAN A.; WATT, NORMAN; and CAMPBELL, DONALD T. "Comparative Validity of Two Projective and Two Structured Attitude Tests in a Prison Population." *Journal of Applied Psychology* 44: 284-88; August 1960.
- MAHONE, CHARLES H. "Fear of Failure and Unrealistic Vocational Aspiration." *Journal of Abnormal and Social Psychology* 60: 253-61; March 1960.
- MASLING, JOSEPH. "The Influence of Situational and Interpersonal Variables in Projective Testing." *Psychological Bulletin* 57: 65-85; January 1960.
- MAYO, GEORGE D., and MANNING, WINTON H. "Motivation Measurement." *Educational and Psychological Measurement* 21: 73-83; Spring 1961.

- MURRAY, EDWARD J. "Conflict and Repression During Sleep Deprivation." *Journal of Abnormal and Social Psychology* 59: 95-101; July 1959.
- MURSTEIN, BERNARD I. "The Measurement of Ambiguity for Thematic Cards." *Journal of Projective Techniques* 24: 419-23; December 1960.
- MURSTEIN, BERNARD I. "The Role of the Stimulus in the Manifestation of Fantasy." *Contemporary Issues in Thematic Apperceptive Methods*. (Edited by Jerome Kagan and Gerald S. Lesser.) Springfield, Ill.: C. C. Thomas, 1961. p. 229-59.
- NEEL, ANN F. "Inhibition and Perception of Movement on the Rorschach." *Journal of Consulting Psychology* 24: 224-30; June 1960.
- PINE, FRED. "Thematic Drive Content and Creativity." *Journal of Personality* 27: 136-51; June 1959.
- PINE, FRED. "A Manual for Rating Drive Content in the Thematic Apperception Test." *Journal of Projective Techniques* 24: 32-45; March 1960.
- PINE, FRED, and HOLT, ROBERT R. "Creativity and Primary Process: A Study of Adaptive Regression." *Journal of Abnormal and Social Psychology* 61: 370-79; November 1960.
- RAPHIELSON, ALFRED C., and MOULTON, ROBERT W. "The Relationship Between Imaginative and Direct Verbal Measures of Test Anxiety Under Two Conditions of Uncertainty." *Journal of Personality* 26: 556-67; December 1958.
- REITMAN, WALTER R. "Need Achievement, Fear of Failure, and Selective Recall." *Journal of Abnormal and Social Psychology* 62: 142-44; January 1961.
- ROSEN, BERNARD C., and D'ANDRADE, ROY. "The Psychosocial Origins of Achievement Motivation." *Sociometry* 22: 185-218; September 1959.
- SANDERS, ELLA M.; MEFFERD, ROY B., JR.; and BOWN, OLIVER H. "Verbal-Quantitative Ability and Certain Personality and Metabolic Characteristics of Male College Students." *Educational and Psychological Measurement* 20: 491-503; Autumn 1960.
- SHELDON, M. STEPHEN; COALE, JACK M.; and COPPLE, ROCKNE. "Concurrent Validity of the 'Warm Teacher Scales.'" *Journal of Educational Psychology* 50: 37-40; February 1959.
- VAN BUSKIRK, CHARLES. "Performance on Complex Reasoning Tasks as a Function of Anxiety." *Journal of Abnormal and Social Psychology* 62: 201-209; March 1961.
- VEROFF, J., and OTHERS. *The Use of Thematic Apperception To Assess Motivation in a Nationwide Interview Study*. Psychological Monographs: Vol. 74, No. 12 (Whole No. 499), 1960. 32 p.
- WALLER, PATRICIA F. "A Comparison of Shading Responses Obtained with Two Rorschach Methodologies from Psychiatric and Non-Psychiatric Subjects." *Journal of Consulting Psychology* 24: 43-45; February 1960. (a)
- WALLER, PATRICIA F. "The Relationship Between the Rorschach Shading Response and Other Indices of Anxiety." *Journal of Projective Techniques* 24: 211-17; June 1960. (b)
- WEISS, PETER; WERTHEIMER, MICHAEL; and GROESBECK, BYRON. "Achievement Motivation, Academic Aptitude, and College Grades." *Educational and Psychological Measurement* 19: 663-66; Winter 1959.

Additional References

- AMES, LOUISE B. "Longitudinal Survey of Child Rorschach Responses: Older Subjects Aged 10 to 16 Years." *Genetic Psychology Monographs* 62: 185-229; August 1960. (a)
- AMES, LOUISE B. "Longitudinal Survey of Child Rorschach Responses: Younger Subjects Two to 10 Years." *Genetic Psychology Monographs* 61: 229-89; May 1960. (b)
- AMES, LOUISE B.; MÉTRAUX, RUTH W.; and WALKER, RICHARD N. *Adolescent Rorschach Responses: Developmental Trends from Ten to Sixteen Years*. New York: Paul B. Hoeber, 1959. 313 p.
- FISHER, RHODA L. *The Effect of a Disturbing Situation upon the Stability of Various Projective Tests*. Psychological Monographs: Vol. 72, No. 14 (Whole No. 467), 1958. 23 p.
- FORER, BERTRAM R., and OTHERS. "Custom-Built Projective Methods: A Symposium." *Journal of Projective Techniques* 25: 3-31; March 1961.
- HENRY, WILLIAM E., and FARLEY, JANE. *The Validity of the Thematic Apperception Test in the Study of Adolescent Personality*. Psychological Monographs: Vol. 73, No. 17 (Whole No. 487), 1959. 40 p.

- HOLTZMAN, WAYNE H. "Objective Scoring of Projective Tests." *Objective Approaches to Personality Assessment*. (Edited by Bernard M. Bass and Irwin A. Berg.) Princeton, N.J.: D. Van Nostrand Co., 1959. Chapter 7, p. 119-45.
- LEDWITH, NETTIE H. *Rorschach Responses of Elementary School Children: A Normative Study*. Pittsburgh: University of Pittsburgh Press, 1959. 185 p.
- LE NOUE, DALE, and OTHERS. "Social Desirability and the Group Rorschach." *Journal of Clinical Psychology* 17: 175-77; April 1961.
- LITTLE, KENNETH B. "Connotations of the Rorschach Inkblots." *Journal of Personality* 27: 397-406; September 1959.
- MAUSNER, BERNARD. "Situational Effects on a Projective Test." *Journal of Applied Psychology* 45: 186-92; June 1961.
- MINER, JOHN B. "The Concurrent Validity of the PAT in the Selection of Tabulating Machine Operators." *Journal of Projective Techniques* 24: 409-18; December 1960.
- RABIN, ALBERT I., and HAWORTH, MARY R., editors. *Projective Techniques with Children*. New York: Grune & Stratton, 1960. 392 p.
- REZNIKOFF, MARVIN. "Social Desirability in TAT Themes." *Journal of Projective Techniques* 25: 87-89; March 1961.
- SCHLEIFER, MAXWELL J., and HIRE, A. WILLIAM. "Stimulus Value of Rorschach Inkblots Expressed as Trait and Affective Characteristics." *Journal of Projective Techniques* 24: 164-70; June 1960.
- SCHNEIDMAN, E. S., and OTHERS. "Symposium: Current Aspects of the Problem of Validity." *Journal of Projective Techniques* 23: 259-90; September 1959.

CHAPTER VII

Development of Statistical Methods Especially Useful in Test Construction and Evaluation

WILLIAM B. SCHRADER

FOLLOWING THE pattern set by Michael in two earlier surveys in the REVIEW, February 1956 and February 1959, the topics to be discussed in this chapter are methodological rather than substantive, with primary emphasis given to formal characteristics of tests and test scores. Factor and cluster analysis and statistical methods relevant to educational research were recently treated in the REVIEW by Michael and Hunka (1960). Construct validity and decision theory are covered in the course of reviewing other topics in this issue.

Prediction and Classification

The problem of predictor selection was the subject of four significant articles. Horst and MacEwan (1960) advocated the use of elimination techniques that successively dropped the weakest predictor from the battery, in contrast to selection techniques that build upon the best predictor. They claimed the elimination technique utilized the information in the intercorrelations among predictors more fully and so was a more effective procedure for arriving at the best subset of predictors. They developed appropriate procedures for both multiple-absolute and multiple-differential prediction. Elfving, Sitgreaves, and Solomon (1959) attacked the basic predictor selection problem from the standpoint of the formal mathematics of linear regression. They investigated the problem of establishing the best set of items (or of tests) for predicting a criterion when the factor structure is known and not necessarily univariate. On the basis of a theorem that defines a criterion for optimum selection, and using a working procedure for approximating the solution, they explored the application of method to a set of actual data for six items and of artificial data for ten items.

Anderson and Fruchter (1960) applied the Doolittle, the Wherry-Doolittle, and the Summerfield-Lubin methods to a set of data and gave a lucid exposition of each method. Comparing the three methods from both the theoretical and the practical viewpoints, they showed Wherry's and Summerfield-Lubin's methods to be equivalent, and they recommended the latter as the most practical. Linhart (1960) developed a new criterion for deciding how many predictors to use. In his procedure, the precision of the subset is compared with that for the entire pool of predictors, and the subset is chosen unless the null hypothesis of no difference in precision is rejected.

There were several contributions relating to the classification problem. Brogden (1959) found an exact solution for the relation between efficiency of classification and the validity and intercorrelations of estimations of job performance for the case in which more than two assignments are considered, provided that certain simplifying assumptions are made. His new results supported his important generalization, reported in 1951, that classification can make a substantial contribution to efficiency even when intercorrelations of predictions are high.

Horst (1960) sought a manageable solution to the differential classification problem by using the quotas to establish a variance-covariance matrix and then transforming the differential predictions so that their variance-covariance matrix would approximate the matrix based on quotas, subject to certain reasonable restrictions. He noted that there should be at least as many predictors as criteria for this approach and urged that the problem of finding a systematic procedure for merging criteria be investigated. Cardinet (1959) described graphic methods for constructing and using a standard profile chart for differential assignment with predetermined quotas.

Special aspects of the prediction problem were treated in three articles. Lubin and Osburn (1960) discussed the application of configural analysis to prediction of a qualitative criterion from dichotomous items. This was achieved by treating each criterion category *versus* all other categories as a dichotomy and by applying the procedure for a quantitative criterion derived earlier by the authors. McHugh and Apostolakis (1959) designed and illustrated a complete analysis plan comparing clinical and actuarial prediction, in which both methods were used to predict membership in unordered categories. Hoffman (1960) described linear and configurational models for predicting clinical judgments based on specified information.

A number of specific statistical developments dealt with matters relevant to prediction problems. Horst (1961) provided a general solution to the problem of determining linear functions of a number of sets of variables so as to make the transformed matrices as similar as possible. In the same article, he described an improved computational procedure for Hotelling's canonical correlation, to which Horst's new development is closely related. Lord (1960b) derived a large-sample analysis-of-covariance procedure for the case where there are two groups and where two measurements of the fallible predictor are available for each subject. Thistlethwaite and Campbell (1960) used a significance test which involved extrapolation of a regression line to compare subjects above and below the cutting score on the predictor variable. Cureton (1958) derived an equation for correcting the average Spearman rank criterion correlation for ties in the predictors.

Norris and Hjelm (1961) conducted an extensive empirical study of the distribution of the Pearson product moment correlation coefficient in samples of 15, 30, and 90 cases drawn from populations constructed to yield two levels of correlation (approximately zero and .83) for a normal

distribution, and two conditions each of kurtosis and skewness. Although there was little deviation from expectation when no correlation was present, with substantial correlation deviations occurred which increased with sample size.

Hooper (1958) derived expressions for the sampling variances of canonical, zero-order, and multiple correlations. Barton and Casley (1958) discussed some of the characteristics of an estimate of the regression coefficient based on mean scores of criterion and predictor for cases in equal tails of the predictor distribution.

A procedure which may find application in collecting criterion data was devised by Gulliksen and Tucker (1961). They applied balanced incomplete block design to the problem of obtaining paired-comparison data by having subjects rank-order a number of suitably constructed short lists. For example, paired comparisons of data for 31 objects can be obtained by having subjects rank 31 lists of 6 objects each.

Additional References: Binder (1959); DuBois and Manning (1960); Madansky (1959); Mayo (1959); Zelen and Severo (1960).

Models for a Theory of Test Scores

In a treatment that outlined the general problems and goals of a systematic program for studying true scores, Lord (1959a) discussed five models for a theory of test scores: (a) In the matched-forms model, he assumed that the expected value of the error of measurement is always zero and that individual true scores are identical across forms. Lord (1959b, c) demonstrated the usefulness of this model subject to certain conditions and used it as the basis for a highly mathematical treatment showing how all cumulants for true scores and errors of measurement can be developed from observed data. (b) In the rationally equivalent forms model, closely related to Kuder-Richardson conceptions, he noted that there must be a large number of hypothetical, rigorously parallel forms, and he assumed that the average covariance of items in the available test is the same as the average covariance of all items. (c) In the item-sampling (formerly matrix-sampling) model, he assumed that the items in the available test are a random sample from a large pool of items. Lord (1959e) demonstrated that this model may show a curvilinear regression of true score on observed score. For linear regression, this model yielded a reliability formula only slightly different from Kuder-Richardson formula 21. Lord (1960c) used this model in a complex empirical study to compute the theoretical distribution of scores on a lengthened test and the scatter diagram of scores on two forms. Theoretical and observed scores agreed satisfactorily. (d) In the Gaussian errors model, he assumed that errors of measurement have a normal distribution, a zero mean, and a constant variance that can be determined empirically. This model permitted application of already developed mathematical methods, but Lord (1960a) found that results of

this approach did not fit empirical data in one study. (e) In the binomial-error model, he assumed that the observed proportions of correct responses have a binomial distribution. This interesting model has not been fully developed because of some apparently intractable mathematical difficulties. Both Gulliksen (1961) and Lord have urged that further empirical studies of these models be conducted.

Reliability

In a study relating reliability estimation to decision theory, Rajaratnam (1960) pointed out that in reliability studies it is customary to have each subject rated by all raters or to have all subjects use the same test form. However, the results are then applied to a situation where raters or test forms are assigned independently to each subject. She derived formulas to provide estimates of reliability for the decision situation, using data collected by the usual reliability study design. In another study concerned with reliability, an empirical study based on 58 tests, Lord (1959g) confirmed his earlier theoretical finding that tests of the same length have the same standard error of measurement. Swineford (1959a), in a related study, noted that this empirical finding was reasonable in light of the fact that the variation in determiners of the reliability coefficient other than test length, in Kuder-Richardson formula 20 reliability, was generally not large enough to have much effect on the outcome. Finally, Saupe (1961) used the findings of these two studies to develop three short-cut procedures for estimating Kuder-Richardson formula 20 reliability.

Along a different line of development, Lyerly (1958) derived Kuder-Richardson formula 21 in split-half terms by making an appropriate assumption. Lord (1959d) pointed out that it was not necessary to make the somewhat implausible assumption that Lyerly described as basic in deriving the formula. Webster (1960) developed, on the basis of a single-classification analysis-of-variance model, a generalization of Kuder-Richardson formula 21 reliability.

Stanley (1961), in connection with a thorough discussion of the analysis of variance of three-way classifications in which he stressed the rater-ratee-trait matrix with complete data, observed that adjustment of the matrix to remove rater biases will affect the Hoyt-Cronbach coefficient of equivalence, but will not affect test-retest or comparable forms coefficients of reliability. Davis (1959b) identified a number of practical situations in which various kinds of average scores are compared with single or average scores, and he worked out in detail the standard error of measurement appropriate to each comparison. He showed how a comparison of groups based on standard error of measurement should be interpreted.

Sampling problems related to reliability were considered by McNemar (1958) and Lyerly (1959). McNemar devised an analysis-of-variance test for determining whether a correlation coefficient is less than unity by an amount greater than could be attributed to chance. For convenience in

computation he expressed the necessary sums of squares in terms of correlation coefficients. Lyerly expressed Kuder-Richardson formula 21 reliability in terms of a quantity known to be distributed as chi-square, and, hence, he was able to develop a table of values of this coefficient necessary to reject the null hypothesis of zero reliability.

Several contributions were concerned with relating reliability formulas to each other or to various statistical concepts. Lord (1958a) showed that the scoring weights for maximizing the generalized Kuder-Richardson formula 20 reliability are the weights which Guttman defined as the principal components of the weighting system. Haggard (1958) discussed the usefulness of the intraclass correlation coefficient as a basis for determining score reliability and derived a number of formulas for intraclass correlation. Edwards (1959) derived two expressions in analysis-of-variance terms corresponding to Tryon's general formula for the reliability of an unstratified composite. Engelhart (1959a) examined the relation between Ebel's analysis-of-variance approach to rating reliability and several of Tryon's formulations of reliability.

Scaling

Although the broad topic of scaling is beyond the scope of this chapter, certain developments in latent structure analysis may be noted. Lazarsfeld (1959) presented a clear account of the main conceptions of latent structure analysis, including a step-by-step exposition of the linear traceline model and some interesting information on other models. He considered also the relation of latent structure analysis to test theory. Madansky (1960), in a complex mathematical presentation, discussed the identifiability of latent parameters. Gibson (1959) introduced a generalization of latent structure analysis, which he called latent profile analysis, designed to deal with quantitative variables rather than dichotomies.

Guttman's scale analysis continued to stimulate methodological studies. Goodman (1959), in an article dealing with many issues in this field, developed large-sample tests for the null hypothesis of item independence for various coefficients defined earlier by Loevinger, Green, and Sagi and large-sample estimates for the error variance of certain coefficients of reproducibility. Sagi (1959) defined a coefficient of reproducibility for which exact distributions could be obtained on the assumption of item independence.

Additional References: Bryden (1960); Jardine (1958); Rimoldi and Grib (1960).

Special Approaches to Test Analysis

Although virtually all of this chapter is concerned with test analysis and design, it seems desirable to consider certain approaches separately. For

example, Campbell and Fiske (1959), in an important methodological article, developed the conception of the multitrait-multimethod matrix (of correlations), which is defined as including at least two traits, each measured by at least two methods. They showed explicitly how such data can contribute to an understanding of what a variable measures. Humphreys (1960) suggested that when intercorrelations of traits for the same method are high, a possible solution is to combine scores across a number of methods in defining each trait. From a somewhat different viewpoint, French (1959) used correlation coefficients and beta-weights of various experience variables for predicting achievement-test scores as indicators of what the test is measuring.

Levine and Lord (1959) described an index of the discriminating power in a particular region of the score range and applied it to the evaluation of the discriminating power of negative scores that may occur when formula scoring is used. Madden, Michael, and Rainwater (1959) presented an IBM 709 FORTRAN program which provides statistics needed for applying Wilks's criterion of equality of means, variances, and covariances for parallel tests.

In an empirical study specifically concerned with certain issues in test design, Swineford (1959b) investigated the relation between two item characteristics, average item-test biserial r and standard deviation of normalized item difficulties, and two test characteristics, raw-score standard deviation and Kuder-Richardson formula 20 reliability. Using appropriate transformations and taking account of the number of items, she found that linear regression yielded correlation coefficients in the .90's for predicting test characteristics. Solomon (1960) gave a lucid, if somewhat formidable, account of the fundamental work on item and test characteristics done by Bahadur, Birnbaum, Elfving, Sitgreaves, and himself. Toops (1960), drawing on many years of experience in testing, called attention to a number of unanswered questions in test design, including the following: (a) What is the relative value of work-limit and time-limit tests, particularly for long-range prediction? (b) How should difficulty data be used in arranging items within a test?

• Profile Analysis

Problems of statistical inference that arise when data are available on a number of variables for each member of each of a number of defined groups were analyzed by Greenhouse and Geisser (1959). They obtained tests of significance of differences in level and in shape of profiles without assuming independence or equal correlations for the variables. Utilizing a method they had devised earlier, they developed an approximate F -test approach and a short-cut conservative test. Finally, they described the multivariate-analysis approach to the problem and assessed the relative merits of the various solutions. Sawrey, Keller, and Conger (1960) tackled

the problem of identifying groups of clusters of profiles after a matrix of distances between each pair of profiles has been computed. They described in detail a systematic procedure for identifying clusters of profiles, which involves determining centroids for clusters and computing new distances from these centroids. Horn (1961) advocated the use of Cattell's r_p as a measure of agreement between pairs of profiles, and he presented a table to facilitate making significance tests. Haggard (1958) showed how intraclass correlation could be applied to certain profile-comparison problems, including the comparison of profiles for the same individual at different times. Haggard and others (1959) considered intraclass correlation as a descriptive measure and noted that four different values could be defined, depending on how the equalization of means and standard deviations was handled. In still another approach, McQuitty (1961) offered a method for the grouping of cases by obtaining an index of agreement for each pair of cases and then assigning cases to clusters so that the *minimum* agreement of any pair in the same cluster was as large as possible.

The problem of interpreting differences in performance on two tests measuring different abilities may be thought of as a special case of profile analysis. Lord (1958b) discussed the rule of interpreting those score differences on different tests which exceed the sum of the standard errors of measurement, and he presented a table showing, for various values of the reliability of the difference, the proportion of examinees for whom judgments would be made and the proportion of those judgments which would be correct. Cronbach and Gleser (1959) took the position that, since counseling involves individual rather than institutional decisions, the appropriate basis for evaluating a decision is not the average risk of error for a group, but the risk in the vicinity of the cutting score, a much more conservative approach in interpreting scores of low reliability. Davis (1958) derived formulas for the standard error of measurement of the differences between a part score and the total score on a test. In extending his results to converted scores, he assumed that a proportionality exists between the raw-score and converted-score standard errors.

Item Analysis

Three articles were concerned with general issues in item analysis. An ingenious and significant utilization of high-speed computers enabled Block (1960) to challenge the common practice of judging the value of a set of items on the basis of the proportion of item coefficients that attain a given level of significance. By analyzing items against a large number of random dichotomizations of the criterion group, he showed that appreciably fewer items showed significant coefficients than would have been expected if the tests had been independent. Maxwell (1959), in a development similar to Finney's application of probits, suggested the substitution of the logistic function for the integrated normal function when estimating the parameters of test items, and he described procedures for using it. Baker (1961) made

an empirical comparison of item parameters obtained, using logistic and normal functions. In a discussion of the two methods, he noted that the value of the logistic-function approach would depend on further developments of mental test constructs in terms of this model.

Indexes of discriminating power, particularly the point biserial correlation coefficient, continued to receive attention. Das Gupta (1960), in a thorough treatment of point biserial and point multiserial correlations, concluded that the models employed by Lev and Tate in developing large-sample sampling errors for point biserial correlation do not fit the conditions of item analysis. He noted, however, that his own solution required calculations too extensive to permit its practical use under existing conditions. Perry (1958) prepared a table of standard errors for point biserial, and Iker and Perry (1960) prepared a table from which the standard error can be obtained by dividing the entry by the square root of the number of cases. Both were based on Tate's formulation. Scott (1960) advocated the use of point biserial r divided by the maximum point biserial, and he developed a simple formula for computing this coefficient. Adams (1960a) made an empirical study of the behavior of biserial and point biserial correlation coefficients for differently shaped score distributions for perfectly valid items. Nonnormal criterion distributions resulted in depressed validity coefficients for difficult items and inflated ones for easy items. Weiner (1959) found that a ranking of items on the basis of Mood's large-sample likelihood ratio test correlated very highly with a ranking using Fisher's exact test for two samples of 25 and 22 cases.

Several computing methods for item analysis were developed. Colver (1959) constructed two nomographs which yield either Flanagan's or Davis' discrimination and difficulty indexes based on the high and low 27 percent of cases. Edgerton (1960) provided a nomograph and table for estimating phi coefficients suitable for use when the proportions on the two variables are reasonably similar and when the geometric mean of the proportions is between .20 and .80.

Iker (1960a, b) developed programs for the Augmented IBM 650, both for a continuous criterion, in which case both biserial and point biserial correlation coefficients are produced, and for a dichotomous criterion, in which case phi coefficients and chi-square values are provided. Adams (1960b) found that, for the conditions he investigated, electronic computer methods were appreciably more costly than hand methods using the graphic item counter. Neither Iker nor Adams appears to have made explicit provision for developing information on the incorrect responses to an item, although such information is often very useful.

Special Approaches to Scoring

A number of approaches to scoring designed to gain more information or information different from that given by conventional scoring definitions were explored. Merwin (1959) evaluated methods of scoring three-

choice items in which the examinee ranks the options. For such data, items could be scored (a) right or wrong, (b) according to the rank assigned to the correct answer, or (c) according to the six possible patterns of answers. By evaluating the performance of different scoring methods for systematically varied item parameters, Merwin concluded that the use of all six patterns was not promising but that the use of scores indicating the rank assigned the correct answer would often be advantageous.

Davis and Fifer (1959) carefully worked out differential weights for each response in two 45-item parallel mathematics tests. They found a correlation of .68 for unweighted scores and of .76 for weighted scores between the two parallel forms. The difference was statistically significant. Validity, using teachers' ratings as a criterion, was not increased. Davis (1959a) discussed methods of defining scoring weights and of scoring papers to obtain weighted scores. A markedly different approach to scoring was taken by Willis (1960), who discussed thoroughly the research possibilities created by having respondents express their degree of agreement or disagreement with attitude items on a graphic rating scale, thus permitting the experimenter to control the percentage of respondents agreeing with each item. In an empirical study, Willis (1961) found marked shifts in the values of various coefficients of internal consistency when items were rescored so that 50 percent of respondents agreed with each item.

Finally, two studies on response set may be noted. Frederiksen and Messick (1959), in an effort to measure stylistic consistencies in personality, used equations for content and set scores developed by Helmstadter. Chapman and Bock (1958) reanalyzed the results of eight studies of acquiescence and content in the California F Scale in terms of a components-of-variance model. Variance components were computed for acquiescence, content, and for their covariance, using an upper and lower estimate for scale reliability.

Scale Transformations

Two studies were primarily concerned with scale transformations. Engelhart (1959b) described procedures used in (a) obtaining comparable scores on two college-entrance-level tests given to the same subjects and (b) equating IQ's on four junior-high-school-level tests, each administered to random (cluster) samples from the same population, and on a fifth test administered to all subjects. He did not explicitly consider the question of parallelism of the tests whose scores were equated. Cliff (1960) found in an empirical study that, although each of two variables having differently shaped distributions were given equal weight in a composite, groups selected on the basis of the composite showed significantly different standard deviations on the two variables.

Norms

Three statistical developments related to test norms seem logically to belong in this chapter. Lord (1959f) discussed a number of statistical

questions related to norms development, particularly cluster sampling and two-stage sampling, and developed formulas for statistical values needed in planning norms studies and in analyzing and evaluating the results. Johnson and Rao (1959) developed the mathematical structure and worked through a practical application for each of five multistage sampling plans. Flanagan (1960) gave a preliminary report on the sampling plans devised for Project Talent with the advice of a distinguished panel of sampling experts.

Bibliography

- ADAMS, JAMES F. "The Effect of Non-Normally Distributed Criterion Scores on Item Analysis Techniques." *Educational and Psychological Measurement* 20: 317-20; Summer 1960. (a)
- ADAMS, JAMES F. "The Use of the Electronic Computer for Item Analysis." *Educational and Psychological Measurement* 20: 611-13; Autumn 1960. (b)
- ANDERSON, HARRY E., JR., and FRUCHTER, BENJAMIN. "Some Multiple Correlation and Predictor Selection Methods." *Psychometrika* 25: 59-76; March 1960.
- BAKER, FRANK B. "Empirical Comparison of Item Parameters Based on the Logistic and Normal Functions." *Psychometrika* 26: 239-46; June 1961.
- BARTON, D. E., and CASLEY, D. J. "A Quick Estimate of the Regression Coefficient." *Biometrika* 45: 431-35; December 1958.
- BLOCK, JACK. "On the Number of Significant Findings To Be Expected by Chance." *Psychometrika* 25: 369-80; December 1960.
- BROGDEN, HUBERT E. "Efficiency of Classification as a Function of Number of Jobs, Per Cent Rejected, and the Validity and Intercorrelation of Job Performance Estimates." *Educational and Psychological Measurement* 19: 181-90; Summer 1959.
- CAMPBELL, DONALD T., and FISKE, DONALD W. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* 56: 81-105; March 1959.
- CARDINET, JEAN. "The Use of Profiles for Differential Classification." *Educational and Psychological Measurement* 19: 191-205; Summer 1959.
- CHAPMAN, LOREN J., and BOCK, R. DARRELL. "Components of Variance Due to Acquiescence and Content in the F Scale Measure of Authoritarianism." *Psychological Bulletin* 55: 328-33; September 1958.
- CLIFF, ROSEMARY. "The Effect of Unlike Distributions on the Weights of Variables." *Educational and Psychological Measurement* 20: 305-10; Summer 1960.
- COLVER, ROBERT M. "Estimating Item Indices by Nomographs." *Psychometrika* 24: 179-85; June 1959.
- CRONBACH, LEE J., and GLESER, GOLDINE C. "Interpretation of Reliability and Validity Coefficients: Remarks on a Paper by Lord." *Journal of Educational Psychology* 50: 230-37; October 1959.
- CURETON, EDWARD E. "The Average Spearman Rank Criterion Correlation When Ties Are Present." *Psychometrika* 23: 271-72; September 1958.
- DAS GUPTA, S. "Point Biserial Correlation Coefficient and Its Generalization." *Psychometrika* 25: 393-408; December 1960.
- DAVIS, FREDERICK B. "The Standard Error of Measurement of the Difference Between a Sum Score and One of Its Parts." *Journal of Educational Psychology* 49: 205-208; August 1958.
- DAVIS, FREDERICK B. "Estimation and Use of Scoring Weights for Each Choice in Multiple-Choice Test Items." *Educational and Psychological Measurement* 19: 291-98; Autumn 1959. (a)
- DAVIS, FREDERICK B. "Interpretation of Differences Among Averages and Individual Test Scores." *Journal of Educational Psychology* 50: 162-70; August 1959. (b)
- DAVIS, FREDERICK B., and FIFER, GORDON. "The Effect on Test Reliability and Validity of Scoring Aptitude and Achievement Tests with Weights for Every Choice." *Educational and Psychological Measurement* 19: 159-70; Summer 1959.

- EDGERTON, HAROLD A. "A Table for Computing the Phi Coefficient." *Journal of Applied Psychology* 44: 141-45; June 1960.
- EDWARDS, ALLEN L. "A Note on Tryon's Measure of Reliability." *Psychometrika* 24: 257-60; September 1959.
- ELEVING, G.; SITGREAVES, R.; and SOLOMON, H. "Item Selection Procedures for Item Variables with a Known Factor Structure." *Psychometrika* 24: 189-205; September 1959.
- ENGELHART, MAX D. "A Method of Estimating the Reliability of Ratings Compared with Certain Methods of Estimating the Reliability of Tests." *Educational and Psychological Measurement* 19: 579-88; Winter 1959. (a)
- ENGELHART, MAX D. "Obtaining Comparable Scores on Two or More Tests." *Educational and Psychological Measurement* 19: 55-64; Spring 1959. (b)
- FLANAGAN, JOHN C. "Project Talent: The First National Census of Aptitudes and Abilities." *Seventeenth Yearbook of the National Council on Measurements Used in Education*. New York: the Council (21 Audubon Avenue), 1960. p. 37-44.
- FREDERIKSEN, NORMAN, and MESSICK, SAMUEL. "Response Set as a Measure of Personality." *Educational and Psychological Measurement* 19: 137-57; Summer 1959.
- FRENCH, JOHN W. "The Relationship of Home and School Experiences to Scores on Achievement Tests." *Journal of Educational Psychology* 50: 75-82; April 1959.
- GIBSON, W. A. "Three Multivariate Models: Factor Analysis, Latent Structure Analysis, and Latent Profile Analysis." *Psychometrika* 24: 229-52; September 1959.
- GOODMAN, LEO A. "Simple Statistical Methods for Scalogram Analysis." *Psychometrika* 24: 29-43; March 1959.
- GREENHOUSE, SAMUEL W., and GEISSER, SEYMOUR. "On Methods in the Analysis of Profile Data." *Psychometrika* 24: 95-112; June 1959.
- GULLIKSEN, HAROLD. "Measurement of Learning and Mental Abilities." *Psychometrika* 26: 93-107; March 1961.
- GULLIKSEN, HAROLD, and TUCKER, LEDYARD R. "A General Procedure for Obtaining Paired Comparisons from Multiple Rank Orders." *Psychometrika* 26: 173-83; June 1961.
- HAGGARD, ERNEST A. *Intraclass Correlation and the Analysis of Variance*. New York: Dryden Press, 1958. 171 p.
- HAGGARD, ERNEST A., and OTHERS. "Intraclass Correlation vs. Factor Analytic Techniques for Determining Groups of Profiles." *Psychological Bulletin* 56: 48-57; January 1959.
- HOFFMAN, PAUL J. "The Paramorphic Representation of Clinical Judgment." *Psychological Bulletin* 57: 116-31; March 1960.
- HOOPER, JOHN W. "The Sampling Variance of Correlation Coefficients Under Assumptions of Fixed and Mixed Variates." *Biometrika* 45: 471-77; December 1958.
- HORN, J. L. "Significance Tests for Use with r , and Related Profile Statistics." *Educational and Psychological Measurement* 21: 363-70; Summer 1961.
- HORST, PAUL. "Optimal Estimates of Multiple Criteria with Restrictions on the Covariance Matrix of Estimated Criteria." *Psychological Reports* 6: 427-44; June 1960. (Monograph Supplement 6-V6.)
- HORST, PAUL. "Relations Among m Sets of Measures." *Psychometrika* 26: 129-49; June 1961.
- HORST, PAUL, and MACEWAN, CHARLOTTE. "Predictor Elimination Techniques for Determining Multiple Prediction Batteries." *Psychological Reports* 7: 19-50; August 1960. (Monograph Supplement 1-V7.)
- HUMPHREYS, LLOYD G. "Note on the Multitrait-Multimethod Matrix." *Psychological Bulletin* 57: 86-88; January 1960.
- IKER, HOWARD P. "Item Analysis on the Augmented IBM 650 Using a Continuous Criterion Variable." *Educational and Psychological Measurement* 20: 153-62; Spring 1960. (a)
- IKER, HOWARD P. "Item Analysis on the Augmented IBM 650 Using a Dichotomous Criterion Variable." *Educational and Psychological Measurement* 20: 163-70; Spring 1960. (b)
- IKER, HOWARD P., and PERRY, NORMAN C. "A Further Note Concerning the Reliability of the Point Biserial Correlation." *Educational and Psychological Measurement* 20: 505-507; Autumn 1960.
- JOHNSON, PALMER O., and RAO, MUNAMARTY S. *Modern Sampling Methods*. Minneapolis: University of Minnesota Press, 1959. 87 p.

- LAZARSFELD, PAUL F. "Latent Structure Analysis." *Formulations of the Person and the Social Context. Psychology: A Study of a Science, Study 1: Conceptual and Systematic*, Vol. 3. (Edited by Sigmund Koch.) New York: McGraw-Hill Book Co., 1959. p. 476-543.
- LEVINE, RICHARD, and LORD, FREDERIC M. "An Index of the Discriminating Power of a Test at Different Parts of the Score Range." *Educational and Psychological Measurement* 19: 497-503; Winter 1959.
- LINHART, H. "A Criterion for Selecting Variables in a Regression Analysis." *Psychometrika* 25: 45-58; March 1960.
- LORD, FREDERIC M. "Some Relations Between Guttman's Principal Components of Scale Analysis and Other Psychometric Theory." *Psychometrika* 23: 291-96; December 1958. (a)
- LORD, FREDERIC M. "The Utilization of Unreliable Difference Scores." *Journal of Educational Psychology* 49: 150-52; June 1958. (b)
- LORD, FREDERIC M. "An Approach to Mental Test Theory." *Psychometrika* 24: 283-302; December 1959. (a)
- LORD, FREDERIC M. "Inferences About True Scores from Parallel Test Forms." *Educational and Psychological Measurement* 19: 331-36; Autumn 1959. (b)
- LORD, FREDERIC M. "The Joint Cumulants of True Values and Errors of Measurement." *Annals of Mathematical Statistics* 30: 1000-1004; December 1959. (c)
- LORD, FREDERIC M. "Randomly Parallel Tests and Lysterly's Basic Assumption for the Kuder-Richardson Formula (21)." *Psychometrika* 24: 175-77; June 1959. (d)
- LORD, FREDERIC M. "Statistical Inferences About True Scores." *Psychometrika* 24: 1-17; March 1959. (e)
- LORD, FREDERIC M. "Test Norms and Sampling Theory." *Journal of Experimental Education* 27: 247-63; June 1959. (f)
- LORD, FREDERIC M. "Tests of the Same Length Do Have the Same Standard Error of Measurement." *Educational and Psychological Measurement* 19: 233-39; Summer 1959. (g)
- LORD, FREDERIC M. "An Empirical Study of the Normality and Independence of Errors of Measurement in Test Scores." *Psychometrika* 25: 91-104; March 1960. (a)
- LORD, FREDERIC M. "Large-Sample Covariance Analysis When the Control Variable Is Fallible." *Journal of the American Statistical Association* 55: 307-21; June 1960. (b)
- LORD, FREDERIC M. "Use of True-Score Theory To Predict Moments of Univariate and Bivariate Observed-Score Distributions." *Psychometrika* 25: 325-42; December 1960. (c)
- LUBIN, ARDIE, and OSBURN, H. G. "The Use of Configural Analysis for the Prediction of a Qualitative Criterion." *Educational and Psychological Measurement* 20: 275-82; Summer 1960.
- LYERLY, SAMUEL B. "The Kuder-Richardson Formula (21) as a Split-Half Coefficient, and Some Remarks on Its Basic Assumption." *Psychometrika* 23: 267-70; September 1958.
- LYERLY, SAMUEL B. "Significance Levels for the Kuder-Richardson (21) Reliability Coefficient." *Educational and Psychological Measurement* 19: 73-75; Spring 1959.
- MCHUGH, RICHARD B., and APOSTOLAKOS, PETER C. "Methodology for the Comparison of Clinical with Actuarial Predictions." *Psychological Bulletin* 56: 301-308; July 1959.
- MCMENAR, QUINN. "Attenuation and Interaction." *Psychometrika* 23: 259-65; September 1958.
- MCQUITTY, LOUIS L. "A Method for Selecting Patterns To Differentiate Categories of People." *Educational and Psychological Measurement* 21: 85-94; Spring 1961.
- MADANSKY, ALBERT. "Determinantal Methods in Latent Class Analysis." *Psychometrika* 25: 183-98; June 1960.
- MADDEN, DALE E.; MICHAEL, WILLIAM B.; and RAINWATER, J. H. "IBM 709 FORTRAN Program for Test Battery Analysis." *Educational and Psychological Measurement* 19: 439-44; Autumn 1959.
- MAXWELL, A. E. "Maximum Likelihood Estimates of Item Parameters." *Psychometrika* 24: 221-27; September 1959.
- MERWIN, JACK C. "Rational and Mathematical Relationships of Six Scoring Procedures Applicable to Three-Choice Items." *Journal of Educational Psychology* 50: 153-61; August 1959.
- MICHAEL, WILLIAM B., and HUNKA, STEVE. "Research Tools: Statistical Methods." *Review of Educational Research* 30: 440-86; December 1960.

- NORRIS, RAYMOND C., and HJELM, HOWARD F. "Nonnormality and Product Moment Correlation." *Journal of Experimental Education* 29: 261-70; March 1961.
- PERRY, NORMAN C. "A Revised Tabulation for Obtaining Significant Values for Point Biserial Correlation." *Psychological Reports* 4: 607-608; December 1958.
- RAJARATNAM, NAGESWARL. "Reliability Formulas for Independent Decision Data When Reliability Data Are Matched." *Psychometrika* 25: 261-71; September 1960.
- SAGI, PHILIP C. "A Statistical Test for the Significance of a Coefficient of Reproducibility." *Psychometrika* 24: 19-27; March 1959.
- SAUPE, JOE L. "Some Useful Estimates of the Kuder-Richardson Formula Number 20 Reliability Coefficient." *Educational and Psychological Measurement* 21: 63-71; Spring 1961.
- SAWREY, WILLIAM L.; KELLER, LEO; and CONGER, JOHN J. "An Objective Method of Grouping Profiles by Distance Functions and Its Relation to Factor Analysis." *Educational and Psychological Measurement* 20: 651-73; Winter 1960.
- SCOTT, WILLIAM A. "Measures of Test Homogeneity." *Educational and Psychological Measurement* 20: 751-57; Winter 1960.
- SOLOMON, HERBERT. "Measures of Worth in Item Analysis and Test Design." *Mathematical Methods in the Social Sciences, 1959*. (Edited by Kenneth J. Arrow, Samuel Karlin, and Patrick Suppes.) Stanford, Calif.: Stanford University Press, 1960. Chapter 22, p. 330-47.
- STANLEY, JULIAN C. "Analysis of Unreplicated Three-Way Classifications, with Applications to Rater Bias and Trait Independence." *Psychometrika* 26: 205-19; June 1961.
- SWINEFORD, FRANCES. "Note on 'Tests of the Same Length Do Have the Same Standard Error of Measurement.'" *Educational and Psychological Measurement* 19: 241-42; Summer 1959. (a)
- SWINEFORD, FRANCES. "Some Relations Between Test Scores and Item Statistics." *Journal of Educational Psychology* 50: 26-30; February 1959. (b)
- THISTLETHWAITE, DONALD L., and CAMPBELL, DONALD T. "Regression-Discontinuity Analysis: An Alternative to the Ex Post Facto Experiment." *Journal of Educational Psychology* 51: 309-17; December 1960.
- TOOPS, HERBERT A. "A Comparison, by Work-Limit and Time-Limit, of Item Analysis Indices for Practical Test Construction." *Educational and Psychological Measurement* 20: 251-66; Summer 1960.
- WEBSTER, HAROLD. "A Generalization of Kuder-Richardson Reliability Formula 21." *Educational and Psychological Measurement* 20: 131-38; Spring 1960.
- WEINER, IRVING B. "A Note on the Use of Mood's Likelihood Ratio Test for Item Analyses Involving 2x2 Tables with Small Samples." *Psychometrika* 24: 371-72; December 1959.
- WILLIS, RICHARD H. "Manipulation of Item Marginal Frequencies by Means of Multiple-Response Items." *Psychological Review* 67: 32-50; January 1960.
- WILLIS, RICHARD H. "An Empirical Test of the Method of Controlled Marginals." *Educational and Psychological Measurement* 21: 39-52; Spring 1961.

Additional References

- BINDER, ARNOLD. "Considerations of the Place of Assumptions in Correlational Analysis." *American Psychologist* 14: 504-10; August 1959.
- BRYDEN, M. P. "A Non-Parametric Method of Item and Test Scaling." *Educational and Psychological Measurement* 20: 311-15; Summer 1960.
- DUBOIS, PHILIP H., and MANNING, WINTON H. "An Analytically Meaningful Approach to Matrix Inversion." *Educational and Psychological Measurement* 20: 705-12; Winter 1960.
- JARDINE, R. "Ranking Methods and the Measurement of Attitudes." *Journal of the American Statistical Association* 53: 720-28; September 1958.
- MADANSKY, ALBERT. "The Fitting of Straight Lines When Both Variables Are Subject to Error." *Journal of the American Statistical Association* 54: 173-205; March 1959.
- MAYO, SAMUEL T. "Toward Strengthening the Contingency Table as a Statistical Method." *Psychological Bulletin* 56: 461-70; November 1959.
- RIMOLDI, H. J. A., and GRIB, T. F. "Pattern Analysis." *British Journal of Statistical Psychology* 13: 137-49; November 1960.
- ZELENE, MARVIN, and SEVERO, NORMAN C. "Graphs for Bivariate Normal Probabilities." *Annals of Mathematical Statistics* 31: 619-24; September 1960.

CHAPTER VIII

Development and Application of Tests of Creativity*

CALVIN W. TAYLOR and JOHN L. HOLLAND

RESEARCH KNOWLEDGE about creativity is scanty. Some of the best research projects are large ones not yet published or still in process. Until a few years ago, the complexities of creativity discouraged research studies in this area. Recently, increased research activities in creativity, in which the subjects have most often been scientists, have been exploratory in nature; several have been very provocative. Many of the researchers have focused on understanding the nature of creativity and of the creative person, rather than hurriedly trying to build a creativity test to market for widespread use; consequently, a great variety of characteristics has been studied by means of several types of measuring instruments. Research has sometimes focused on a characteristic, such as independence, which has been measured by several separate devices; in other instances it has focused on possible measures of creative potential—for example, on high-level aptitude-type tests as opposed to personality or motivation-type tests. Much of the research reported was directed toward finding concomitant characteristics of creativity that should eventually permit building tests of creativity potential.

The over-all pattern of research measuring creative giftedness has not followed the pattern of research on intellectual giftedness. Moreover, some researchers will argue that the burgeoning research movement in creativity, with its broad approach and resistance to premature crystallization, is much healthier than was the intelligence-testing movement, especially for long-range research purposes and for avoiding similar pitfalls.

Several relatively large and sustained research programs involving creativity have loosely co-ordinated their efforts through conferences (C. W. Taylor, 1956, 1958a, 1959). These research projects have been able to draw upon a considerable body of basic research findings about human characteristics, especially those findings that have emerged from factorial research studies on intelligence, personality, and motivation. Computers have facilitated the use of large and complex patterns of tests and have made possible large factor-analysis and multiple-correlation studies involving several individual criteria of creativity. Item-alternative analyses of relatively long psychological inventories against creative criteria are becoming relatively routine. But the task of selecting predictors for a particular study from the large number of potentially valid predictors of

* This review is based on a report on the prediction of creative performance presented at the 1961 University of Utah Research Conference on the Identification of Creative Scientific Talent (supported by the National Science Foundation). The report was designed to summarize present research knowledge and to indicate the most promising leads and most urgent needs for future research in creativity. Tony Jacobsen deserves credit for his help in preparing and documenting this review.

creative performance must be done by the researcher, not the computer. Consequently, each experimental battery differed from others, but, usually, each involved a small subset of 20 or 30 promising new intellectual tests (not found in the typical intelligence-test composite) plus various nonintellectual tests. Some experimental batteries for creativity have even been entirely nonintellectual in nature. For example, the current unpublished Utah studies of National Aeronautics and Space Administration scientists have used only a long complex biographical inventory as a predictor of each of several criteria.

Traditional Measures of Creativity

Before samples of the most relevant research are reviewed, preliminary comments are in order about certain widely available measures of characteristics of individuals.

If school grades were efficient predictors of creativity, the identification of persons with outstanding creative potential would be simple. Not only certain school grades, but school grades in general, have been shown to have low validity in predicting creative performance (C. W. Taylor, 1958b; C. W. Taylor and others, 1961). If grades are ever to become valid predictors, a significant portion of school activities may have to be changed to demand creative performance and behavior.

Mere accumulation of knowledge does not appear to be sufficient for creative performance; it does not guarantee that the incubation and insight stages of the creative process will occur. One can easily cite examples in the academic world of people who are extremely learned in their fields, but who have demonstrated little creative behavior.

Evidence is gradually accumulating that traditional intelligence tests, at best, reveal only minor variations in creative performance; they do not directly involve the ability to create new ideas or things. In factor-analysis studies by many research workers, the factors involving the ability to sense problem areas, to be flexible in each of several ways, and to produce new and original ideas tend to be unrelated or to have little relation to tests used to measure intelligence (French, 1951; Guilford, 1959). Chorness (1956) studied civilian Air Force personnel who had suggested ideas that were officially accepted by their organizations. He found that their approximate IQ scores (from the information scales of the *Wechsler-Bellevue Intelligence Scale*) were spread across the entire range of the IQ's of the sample of civilian personnel.

D. W. Taylor (1958) found that the *Terman Concept Mastery Test* (designed specifically as an adult-intelligence measure for Terman's follow-up studies) had no significant correlations with supervisory ratings of scientists on creativity, productivity, or originality. Every other intellectual test in this study showed at least some significant validities with these criteria, but it could be argued that there was some restriction of range in the study.

Getzels and Jackson (1959) and Torrance (1959) reported that if an intelligence test is used to select top-level talent, about 70 percent of the persons with the highest 20 percent of the scores on a "creativity" battery will be missed. Eighty percent, just 10 percent more, would be missed if the intelligence and "creativity" scores were completely unrelated. Torrance has replicated these findings with less restricted groups in yet unpublished studies. The two so-called creativity batteries, however, were not identical in composition and might more safely be called "divergent-thinking" batteries until they are more adequately validated against suitable external criteria of creativity.

The same type of naming problem still exists for the so-called intelligence tests. Among the nearly 60 dimensions of the mind discovered to date, more than 50 should now be described as *nonintelligence* intellectual dimensions, according to C. W. Taylor (1961), even though intelligence has often been very broadly defined.

Roe (1951, 1953), in studies of eminent scientists, reported that their intelligence scores were all distinctly above average. But this would be expected, since these scientists had been screened through a long, formal, academic program, the grades in which are usually highly correlated with intelligence-test scores. The assumption that this long, formal, academic program (as now constituted) is completely relevant and prerequisite to research and creative work in the sciences (in contrast especially to the arts) is being challenged by researchers who are finding low or negative correlations of academic grades with on-the-job performance in research work (C. W. Taylor, 1958b; Martin and Pachares, 1960; C. W. Taylor and others, 1961). Evidence to support this challenge is found in the unexpected and remarkable readiness of high-school students to do research of publishable quality in the research-participation programs of the National Science Foundation Summer Science Program for Secondary Students; Riley and Overberger (1961) described an example of such readiness.

Guilford and Allen (Guilford, 1959) selected some 28 dimensions of the mind that they felt were relevant to success in the physical sciences. Using clearly stated descriptions as well as a sample item from a best test for each of these 28 intellectual characteristics, they asked each of a number of scientists of various types to rank these 28 characteristics for importance in his individual job. Nineteen of the top 20 were nonintelligence intellectual characteristics. Rated below the twentieth were several characteristics usually included in commonly used intelligence tests.

The majority of studies suggested that the relation of intelligence tests or components of intelligence tests to creative performance is generally low (.20 to .40) in unselected populations and is zero and even negative for homogeneous samples at high levels of intelligence (MacKinnon, 1959; Holland, 1961; Mullins, 1959; and Yamamoto, 1961). The best conclusion at present is that intelligence, as measured, accounts for only a minor

portion of the variation in creative performance and, by itself, is by no means an adequate measure of creativity. In fact, nearly all research attempts to measure and study creativity have focused upon nonintelligence intellectual tests, nonintelligence tests, biographical inventories, and environmental factors.

Multivariable Approaches to Creativity

The forerunners of multivariable approaches to creativity were large factor-analysis studies of well-designed batteries. For example, important pioneering work was accomplished by L. L. Thurstone and his students, who initially analyzed the intelligence-test composites into multiple factors and later extended these efforts into new intellectual areas not covered by intelligence tests. Thurstone (1952) himself wrote a provocative report on creativity.

J. P. Guilford and his colleagues have actively advanced this type of work during the past two decades; their efforts culminated in Guilford's (1956) three-dimensional model of the structure of intellect. Guilford's most relevant study was a factor analysis of a large battery of "creativity" tests (Guilford, Wilson, and Christensen, 1952; Guilford and others, 1951) that formed a main basis for his later statement that some components of memory, cognition, evaluation, convergent production, and especially divergent production are involved in creative work. More specifically, the high-level aptitude (or intellectual) factors most involved are probably originality, adaptive flexibility, spontaneous flexibility, ideational fluency, expressional fluency, associational fluency, word fluency, sensitivity to problems, visualization, judgment, and redefinition (Guilford, 1959).

Investigations of creative promise have typically emphasized a broad range of assessment variables, an emphasis somewhat in contrast to the identification of the so-called intelligence type of giftedness by means of such a single measure as IQ score. Creativity measures have mainly included new intellectual characteristics not contained in IQ tests—motivational, biographical, sociometric, and other personality characteristics.

Stein (1956) studied 46 industrial-research chemists who were selected on the basis of composite ratings on creativity by supervisors, colleagues, and subordinates. He subjected them to a two-day individual and group psychometric analysis designed to yield both biographical and self-evaluative information on certain variables. On the basis of biographical data, Stein found that the more creative chemists, in contrast to the less creative ones, came from lower socioeconomic levels, engaged in solitary activities earlier in life, and had parents of lower educational level who were more distant and inconsistent. From the self-evaluations, Stein found that the more creative chemists tended to be more autonomous, strove for more distant goals, had more integrative attitudes, were more cautious and realistic, were more consistent in their desires for rewards, had a more dif-

ferentiated value hierarchy, and perceived themselves as assertive and authoritative, with leadership ability.

In a study of 103 Navy electronics laboratory scientists by D. W. Taylor (1958), the American Institute for Research Test for Selecting Research Personnel had the most significant, though somewhat low, validities (in the .20's and .30's) against supervisory ratings on creativity, compared with several other tests. This test, consisting of 150 multiple-choice problem situations, attempts to analyze three types of job performances relevant to research: (a) formulating problems and hypotheses and planning and designing investigations, (b) conducting investigations and interpreting research results, and (c) accepting organizational and personal responsibility. The other tests with less promise or without promise were, in descending order, the *Owens-Bennett Mechanical Comprehension Test*, the *Test of Productive Thinking*, the *Terman Concept Mastery Test*, and the *Strong Vocational Interest Blank* (Engineering key). The study was cross-validated on a second sample of 66 Navy scientists.

The creativity research of MacKinnon and staff has continued with good financial support for several years. They invited some 260 highly creative individuals in the areas of writing, architecture, and mathematics, who were nominated by nationally recognized persons in the fields concerned, for a three-day assessment program at the Institute of Personality Assessment and Research. Barron (1959) reported that these subjects were being evaluated on a multiplicity of variables. Qualities such as the following, which Barron reported as appearing in this highly selective group, have been shown to be characteristic by later work, as yet unpublished: an intensity of moral and aesthetic commitment; a component of sexuality in psychic creativity; voluminous production; and diligence, discipline, and total commitment with respect to their work.

Cattell (1959), in a study of 144 leading research physicists, biologists, and psychologists, drew three conclusions. First, the personality profiles of these researchers differed significantly (.01) from that of the average man, particularly as follows: the researchers were more schizothyme, intelligent, dominant, inhibited, emotionally sensitive, and radical, and they were more given to controlling their behavior by an exacting self-concept. Second, the researchers' personality profiles differed from those of persons of equal general intelligence who were outstanding in administration or teaching, specifically as follows: the researchers were more schizothyme, less emotionally stable, more radical, and uniformly lower on all primary personality factors measuring extroversion. Finally, when the researchers' profiles were compared with those of persons eminent in literature and the decorative arts, both groups were shown to be more schizothyme, intelligent, dominant, desurgent, radical, and self-sufficient than average.

Getzels and Jackson (1959) drew 26 "highly creative" and 28 "highly intelligent" adolescents from a group of 449 high-school students on the basis of their performances on an IQ measure and of a summated score on five "creative" instruments (Word Association, Uses for Things, Hidden

Shapes, Fables, and Make-Up Problems). The two groups were then compared on a variety of variables and measures with the following results: the high-IQ subjects used stereotyped meanings, had conventional standards of success, and aspired for conventional careers, whereas the highly creative subjects diverged from stereotyped meanings, had unconventional standards of success, and aspired for unconventional careers. Studies of this type have had an important effect in arousing interest in creativity.

Torrance (1959), in a series of studies exploring creative thinking in the early school years, developed a tentative battery of measures for identifying creative elementary-school children and comparing them with their classmates on certain variables. Such measures include the inventive manipulation of toys, alternative solutions to frustrating situations in well-known children's stories, the Ask-and-Guess Test, and modified test items for eliciting creative thinking. For example, through sociometric or peer nominations in 33 classrooms, Torrance found, with advancing grade levels, a progressive increase in peer sanctions against highly creative children.

The use of creativity-test scores as criteria by Getzels and Jackson and by Torrance has suggested other potential predictors. This plan for investigating appears to be a useful first step; it usually provides a reliable, immediate criterion. The value of such a criterion for discovering and validating predictors lies in the degree to which such devices are equivalent to other more remote or more relevant criteria of creative performance. Such test scores may be useful in defining more explicitly the nature of adult creativity after these scores have also been employed as predictors of creative performance in longitudinal studies.

The Utah studies of Air Force scientists probably are the most extensive example to date of multivariable research in creativity (Taylor and others, 1961). Approximately 50 criterion scores on each scientist were obtained from immediate supervisors, higher-level supervisors, peers, the scientist himself, official records, lists and samples of reports and publications, professional-society membership, college records, and interviews by the project researcher. Almost a year was spent in the research organizations collecting the criterion data and obtaining 130 test scores in five spaced test-administration periods. Shrinkage in sample size occurred during this long, intensive data-collection period, so that complete criterion data were available on 166 of the 210 scientists; test data obtained were complete for 107 of these and almost complete for 33 more. Even this heavy testing program employed only about half the number of the intellectual tests that were deemed promising measures of creative performance. Match Problems, Consequences, Word Association, and Visual Imagery were four of the seven intellectual tests used. The validities of the best individual scores against 14 factored criteria ranged in the .20's to .40's, with more than 30 scores being valid for most criteria. Multiple-correlation analyses showed that approximately half the variance in any of the 14 criteria of creative and other scientific contributions may be overlapped by a

linear regression combination of 15 or more valid test predictors. The shrinkage on cross-validation is not yet known.

In summary, there is still uncertainty about the degree to which the foregoing sets of "creativity" tests are valid predictors of important creative performance. The final check of the many concurrent-validity studies will be predictive-validity studies. Nevertheless, these "creativity" tests are, without doubt, measuring intellectual processes and nonintellectual characteristics that are not closely related to those involved in high intelligence-test scores.

Additional References: Bloom (1956); Drevdahl (1954); Harmon (1958); Sprecher (1959).

Single-Test Studies of Creativity

Nearly every study involving even a brief biographical inventory or biographical approach for predicting creativity in scientists has been found to have promising validity in the initial sample studied (Stein, 1956; Knapp, 1956; C. W. Taylor, 1958; Roe, 1958, 1959; Owens, Schumacher, and Clark, 1958; Cattell, 1959; Ellison, 1960; C. W. Taylor and others, 1961; Holland and Astin, 1961; Smith and others, 1961; Mullins, 1959). Mullins did not get good results on cross-validation. Surprisingly high cross-validities (.46 to .56) against creativity criteria have been found in current unpublished studies of four samples of 654 scientists, in which the principal investigators followed up previous biographical studies on Utah scientists (Ellison, 1960) and 107 Air Force scientists (C. W. Taylor and others, 1961). In each of these six studies, item analyses of all responses were made on every sample in an attempt to formulate empirical keys to be cross-validated on other samples. Sizable cross-validities for a biographical inventory were found by Smith and others (1961).

Such special-aptitude tests as the Guilford battery, devised to measure creative ability, have had only modest success. The evidence for the validity of such tests is still incomplete and unclear. In some of these tests, there are evidences of restriction of range which make results unclear when significant validities are not obtained (C. W. Taylor and others, 1961). Chorness and Nottelmann (1957) found that an intelligence measure predicted employee "creativity" as well as did selected tests from the Guilford battery. In such instances, it should be recognized that, in both the academic world and the business world, testees with high intelligence scores probably have an initial advantage, because of current emphasis on such scores, over testees obtaining high scores on creativity-disposing intellectual characteristics. The latter must emerge on their own in competition with those enjoying the initial advantage.

In the majority of studies of creative persons, there has been a strikingly consistent emergence of a sizable number of personal traits relevant to creativity (e.g., independence). These characteristics alone may be of

minor significance in their contribution to the total variance in creative performance. But this consistency contrasts sharply with the frequent conflicts in early results in other areas of psychological research.

Ghiselin (1956) described how an approach for obtaining descriptions of the creative process might eventually help in the identification of the creative individual. More recently, Ghiselin developed a Creative Process Check List for the separation of more creative persons from less creative persons. Each subject was asked to check 37 adjectives (items) describing his "states of attention" and 39 adjectives describing "states of feeling," on the basis of whether he experienced them before, during, and/or after problem-solving experiences in his work. The first a priori attempts to score this check list, in C. W. Taylor and others' (1961) study of Air Force scientists, were, in general, not successful.

At the 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent, the Word Association Test, scored for remote associations, appeared to be one of the most promising predictors. The test has since, however, yielded conflicting results, including zero validities and instances where a common-associations score predicted better than did a more-remote-associations score (Hills, 1958; C. W. Taylor and others, 1961). Two-way association tests included in factor studies usually have produced a factor pattern similar to the one-way Word Association Test. How a three-way association test differs enough from these one-way and two-way association tests to yield high validities remains to be determined.

Typical interest inventories, with a few exceptions, generally have been poor predictors. In a battery of 69 predictors including aptitude, personality, and originality scales, self-ratings, and teacher ratings, Holland (1961) found *simple* interest measures to be among the best predictors of creative performance. A complex motivational device, used in a study of Air Force scientists, had very few significant validities against several criteria, whereas a considerably higher percentage of the validities was significant for a brief and simple device measuring minimum aspirational level in several different aspects of scientific work (C. W. Taylor and others, 1961).

The validity of such personality inventories as the *California Personality Inventory*, *Sixteen Personality Factor Questionnaire*, and Saunders' experimental Personality Research Inventory is generally low, although there is considerable variation according to studies by Holland and Astin (1961) and C. W. Taylor and others (1961). In the latter study, the Personality Research Inventory yielded valid-appearing scores in self-acceptance, tolerance of ambiguity, self-sufficiency, masculine vigor, artistic ability *versus* practicality, progressivism *versus* conservatism, and liking for thinking. However, only 8 percent of the validity coefficients for all 130 criterion tests were significant at the 5-percent level. The evidence for the validity of nonintellectual originality scales falls at about the same level, although there is again a wide range of correlations.

Simple self-ratings in adolescent and adult samples have proved to have moderate validity for a variety of creative performances. Terman's earlier work also showed that ratings of self-confidence, persistence, and integration toward goals were among his most efficient predictors of adult achievement. In C. W. Taylor and others' (1961) study of Air Force scientists, the best over-all predictor of all 14 criteria of creativity was a self-rating of creativity, which also was valid for every one of the 6 with creative components out of the 14 factors. Self-ratings on several other characteristics (e.g., resourcefulness, desire for discovery, discrimination of value, and intuition) also had moderate validity for many of the creativity criteria.

Supervisors' ratings appear to be of some value for predicting creative performance, according to Buel (1960). Supervisors' ratings of creativity have also been used with success as rating criteria, and these have been predicted significantly by psychological scores in several studies, including the current Utah biographical study of NASA scientists and the Utah study of Air Force scientists (C. W. Taylor and others, 1961). In the latter study, the supervisory ratings of creativity were significantly correlated with 29 percent of the 130 test scores. Peer nominations and rankings also worked well in the Utah study of Air Force scientists; they were predicted by 35 percent of the test scores. Well-constructed ratings and descriptions by appropriately selected persons may be one of the more promising approaches for predicting creative performance, although, to date, such ratings have usually been used as criteria.

Several investigators have begun work on unique devices and techniques for predicting creative performance, but at present no evidence for their validity is available. A new individual device called Problem Solving Apparatus, invented by John (1958), is highly complex and interesting and may have potential as a predictor.

A review of the current status of predictors of creative performance suggests the following crude ordering of predictors, by class, with respect to their efficiency: biographical items and past achievements, self-ratings and direct expressions of goals and aspirations, originality and personality inventories, aptitude and intelligence measures (except where restriction-of-range corrections are applicable), and parental attitudes. Any such ordering of promising predictors is admittedly hazardous, since it is subject to unknown biases and errors.

Criteria of Creativity

There is need for exploration and development of multiple criteria of creative performance. The most comprehensive reports now available on the crucial problem of criteria are those of criterion subgroups of the University of Utah creativity conferences of 1955, 1957, and 1959. It is clear from the large criterion study of Taylor, Smith, and Ghiselin (1959) that

no single criterion of performance is adequate or desirable, since some criteria are relatively independent of one another. In this study, approximately 50 criterion measures of the creative and other contributions of 166 Air Force scientists were obtained and factor-analyzed to yield 14 meaningful factors. Nearly one-half of these factors included aspects of creativity. One factor involved originality in writing; another entailed supervisory ratings on creativity (as well as on flexibility and independence); a third included two creativity ratings by higher-level supervisors; a fourth showed that the self-rating on creativity had the highest loading. Two other factors included patent rate in their clusters, and another may entail some form of creativity in administrative work since organizational awards had its highest loading with that factor.

Bibliography

- BARRON, FRANK. "Current Work at the Institute of Personality Assessment Research." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. Edited by Calvin W. Taylor. Salt Lake City: University of Utah Press, 1959. p. 72-76.
- BUEL, WILLIAM D. "The Validity of Behavioral Rating Scale Items for the Assessment of Individual Creativity." *Journal of Applied Psychology* 44: 407-12; December 1960.
- CATTELL, RAYMOND B. "The Personality and Motivation of the Researcher from Measurements of Contemporaries and from Biography." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 77-93.
- CHORNESS, MAURY. "An Interim Report on Creativity Research." *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1956. p. 132-55.
- CHORNESS, MAURY, and NOTTELMANN, D. N. *The Prediction of Creativity Among Air Force Civilian Employees*. Technical Note, AFPTRC-TN-57-36, ASTIA Documents No. 126366. Lackland Air Force Base, Texas: Air Force Personnel Training Research Center, Air Research and Development Command, March 1957. 24 p.
- ELLISON, ROBERT L. *The Relationship of Certain Biographical Information to Success in Science*. Master's thesis. Salt Lake City: University of Utah, 1960. 210 p.
- FRENCH, JOHN W. *The Description of Aptitude and Achievement Tests in Terms of Rotated Factors*. Psychometric Monograph No. 5. Chicago: University of Chicago Press, 1951. 278 p.
- GETZELS, J. W., and JACKSON, P. W. "The Highly Intelligent and the Highly Creative Adolescent: A Summary of Some Research Findings." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 46-57.
- GHISELIN, BREWSTER. "The Creative Process and Its Relation to the Identification of Creative Talent." *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1956. p. 195-203.
- GUILFORD, J. P. "The Structure of Intellect." *Psychological Bulletin* 53: 267-93; July 1956.
- GUILFORD, J. P. "Intellectual Resources and Their Values as Seen by Scientists." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 128-49.
- GUILFORD, J. P.; WILSON, R. C.; and CHRISTENSEN, P. R. *A Factor-Analytic Study of Creative Thinking. II. Administration of Tests and Analysis of Results*. Reports from the Psychological Laboratory, No. 8. Los Angeles: University of Southern California, 1952. 24 p. (Offset)

- GUILFORD, J. P., and OTHERS. *A Factor-Analytic Study of Creative Thinking. I. Hypotheses and Description of Tests*. Reports from the Psychological Laboratory, No. 4. Los Angeles: University of Southern California, 1951. 27 p. (Offset)
- HILLS, JOHN R. "Recent Creativity Studies at Educational Testing Service." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 181-91.
- HOLLAND, JOHN L. "Creative and Academic Performance Among Talented Adolescents." *Journal of Educational Psychology* 52: 136-47; June 1961.
- HOLLAND, JOHN L., and ASTIN, ALEXANDER W. *The Prediction of Academic, Artistic, Scientific, and Special Achievement Among Undergraduates of Superior Scholastic Aptitude*. Evanston, Ill.: National Merit Scholarship Corporation, 1961. 14 p. (Mimeo.)
- JOHN, ERWIN R. *Contributions to the Study of the Problem-Solving Process*. Psychological Monographs: General and Applied, Vol. 71, No. 18 (Whole No. 447), 1958. 39 p.
- KNAPP, ROBERT H. "Demographic Cultural and Personality Attributes of Scientists." *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1956. p. 204-12.
- MACKINNON, DONALD W. "What Do We Mean by Talent and How Do We Test for It?" *In the Search for Talent*. College Admissions, No. 7. New York: College Entrance Examination Board, 1959. p. 20-29.
- MARTIN, ROBERT A., and PACHARES, JAMES. *Evaluating Engineers and Scientists for a Research and Development Activity*. Calvia City, Calif.: Hughes Aircraft Co., 1960. 22 p. (Multilithed)
- MULLINS, CECIL J. *The Prediction of Creativity in a Sample of Research Scientists*. Technical Note, WADC-TN-59-36, ASTIA Documents No. AD 211039. Lackland Air Force Base, Texas: Personnel Laboratory, Wright Air Development Center, Air Research and Development Command, February 1959. 14 p.
- OWENS, W. A.; SCHUMACHER, C. F.; and CLARK, J. B. "The Measurement of Creativity in Machine Design." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 129-40.
- RILEY, REED F., and OVERBERGER, C. G. "A Summer Research Participation Program for High School Students." *Journal of Chemical Education* 38: 424-27; August 1961.
- ROE, ANNE. "Psychological Tests of Research Scientists." *Journal of Consulting Psychology* 15: 492-95; December 1951.
- ROE, ANNE. *The Making of a Scientist*. New York: Dodd, Mead, & Co., 1953. 244 p.
- ROE, ANNE. "Early Differentiation of Interests." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 98-108.
- ROE, ANNE. "Personal Problems and Science." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 202-12.
- SMITH, WALLACE J., and OTHERS. "The Prediction of Research Competence and Creativity from Personal History." *Journal of Applied Psychology* 45: 59-62; February 1961.
- STEIN, MORRIS I. "A Transactional Approach to Creativity." *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1956. p. 171-81.
- TAYLOR, CALVIN W., editor. *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. Salt Lake City: University of Utah Press, 1956. 268 p.
- TAYLOR, CALVIN W., editor. *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. Salt Lake City: University of Utah Press, 1958. 255 p. (a)
- TAYLOR, CALVIN W. "Some Variables Functioning in Productivity and Creativity." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 3-19. (b)

- TAYLOR, CALVIN W., editor. *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. Salt Lake City: University of Utah Press, 1959. 334 p.
- TAYLOR, CALVIN W. "A Tentative Description of the Creative Individual." *Human Variability and Learning*. Washington, D.C.: Association for Supervision and Curriculum Development, a department of the National Education Association, 1961. p. 62-79.
- TAYLOR, CALVIN W.; SMITH, WILLIAM R.; and GHISELIN, BREWSTER. "Analyses of Multiple Criteria of Creativity and Productivity of Scientists." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 5-28.
- TAYLOR, CALVIN W., and OTHERS. *Explorations in the Measurement and Prediction of Contributions of One Sample of Scientists*. Technical Report ASD-FR-61-96. Lackland Air Force Base, Texas: Personnel Laboratory, Aeronautical Systems Division, Air Force Systems Command, April 1961. 62 p.
- TAYLOR, DONALD W. "Variables Related to Creativity and Productivity Among Men in Two Research Laboratories." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 20-54.
- THURSTONE, L. L. "Creative Talent." *Applications of Psychology*. (Edited by L. L. Thurstone.) New York: Harper & Brothers, 1952. Chapter 2, p. 18-37.
- TORRANCE, E. PAUL. "Explorations in Creative Thinking in the Early School Years: A Progress Report." *The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1959. p. 58-71.
- YAMAMOTO, KAORU. *Creativity and Intellect: Review of Current Research and Projection*. Paper presented to the Minnesota Psychological Association, April 1961. Minneapolis: University of Minnesota. 17 p. (Mimeo.)

Additional References

- BLOOM, B. S. "Report on Creativity Research at the University of Chicago." *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1956. p. 204-12.
- DREYDAHL, JOHN E. *An Exploratory Study of Creativity in Terms of Its Relationship to Various Personality and Intellectual Factors*. Doctor's thesis. Lincoln: University of Nebraska, 1954. 113 p. Abstract: *Dissertation Abstracts* 14: 1256; No. 8, 1954.
- HARMON, LINDSAY R. "The Development of a Criterion of Scientific Competence." *The Second (1957) University of Utah Research Conference on the Identification of Creative Scientific Talent*. (Edited by Calvin W. Taylor.) Salt Lake City: University of Utah Press, 1958. p. 82-97.
- SPRECHER, THOMAS B. "A Study of Engineers' Criteria for Creativity." *Journal of Applied Psychology* 43: 141-48; April 1959.

CHAPTER IX

Review of This Issue

CHESTER W. HARRIS

THIS REVIEW of the preceding chapters is an innovation. Whether or not it will establish a new and vital tradition is problematical. One possibility is that this will become a unique chapter, since perhaps never again will an editor be able to find someone with the temerity implicitly to advertise himself as the indefatigable reader, the generalist-yet-expert, and the informed critic of all that an issue includes—in this instance all that is implied by that omnibus term *testing*. However, if a tradition is to be established, the purpose of a critical chapter such as this should be defined. A chapter of this kind clearly *should not* be a recitation of failures—failure to incorporate someone's study, failure to omit someone's study, or failure to place someone's study properly in the organization of the issue. Similarly, cavils about overlap, the order of the chapters, or the peculiar biases of certain contributors should be omitted. Criticism, in its narrow sense, should be a minor component. The chapter *should*, however, present a judgment of the extent to which the issue provides more than an abstracting service—valuable as that service may be. The paragraphs that follow are an attempt to illustrate possible major components.

Although it is sometimes pedantic to cite history, such citations may be pertinent. For example, let us recall the early work of Binet and Simon and of Terman and ask what is being done now, as seen by the contributors to this issue, that is different from this early work. It is true that we have some different terms, such as *creativity*, in active use. It also is true that we have *factors*—and that conceiving of factors as plural seems to depart somewhat from the early Binet-Simon-Terman tradition. Further, we have a considerable amount of machinery that was not widely known or not available to earlier workers: item-analysis procedures, computation aids, measures of relationship, and the like. Nevertheless, we seem to be studying many of the same problems in essentially the same way.

For example, Binet and Simon (1916) reported, in connection with their 1911 scale, studies of the relation of intellectual level to scholastic standing (p. 288-92), of the effect of repetitions (p. 292-94), of the methods teachers use to judge intelligence (p. 297-316), and of the relation between intelligence and social background (p. 316-29). On this last point they cited data, not only from their own investigations, but also from investigations in Belgium and England. Similarly, Terman (1916, p. 65-77) reported studies of retesting; of sex differences; of the relation of the newly derived IQ to social class; and of the relation of this IQ to school work, grade progress, and teachers' estimates. Terman also analyzed his tests in relation to the

whole scale. Thus we have in these two sources at least the outline of investigations of reliability, of concurrent and/or predictive validity, of sex differences, and of social-class differences, which we are still consistently following. That we have continued, over a period of 50 years, to regard these as important types of investigation speaks well for our predecessors. In summarizing for the recent period such empirical studies of particular tests—reliability estimates, validity coefficients in relation to specified criteria, mean differences for groups that differ in social background, and the like—this issue serves an important function.

Some comment about *factors* is necessary. It is clear that a dependence upon factor analysis has characterized many of the studies reported here; it also is clear that a variety of procedures that may give somewhat different results have been subsumed under the general heading of factor analysis. There is hope that new work, such as that of the study group initiated by Ledyard Tucker at the University of Illinois, will clarify these differences and possibly arrive at rational bases for restricting the number of appropriate procedural variants. Such achievement is in the future, however, and present work still exhibits contradictory conclusions that may be the function of technical rather than substantive differences.

In addition to the technical questions, the problem of the proper role of factor analysis in test development is still with us. There is some evidence in this issue that we do recognize that it is not sufficient to announce the existence of an *aptitude*, *mental ability*, or *personality trait* on the basis of naming a factor derived from some conveniently available set of test responses. The Campbell-Fiske model (1959), on which several contributors comment favorably, reminds us that in such situations we may simply turn up *instrument* factors and mistakenly identify them with *traits*. The emphasis on being able to conceive more than one method or instrument in order to demonstrate the measurement of a trait is a healthy one.

Also relevant to the question of the proper role of factor analysis in test development are the attempts to develop and use some fairly systematic classification scheme or taxonomy of the traits, abilities, or what you will, as a guide to test development and then to use factor analysis to throw light on the independence and verifiability of the postulated elements in the framework. The *needs* schema and the *structure of intellect* illustrate classification systems in two somewhat different domains that may be treated this way. The best such treatment demands that *theory* be given a primary role, and that the empirical work be capable of turning up both positive and negative answers, as well as interesting new leads. Certainly, if our procedures are such that we must always find factors that can be interpreted—possibly with some strain—as belonging to our *theory*, we may simply engage in a random process that constantly shuffles the terms without altering their meanings. The periodic stirring of the *MMPI* pot merely to derive new factors illustrates this possibility well.

Both educational and psychological testing seem, from the foregoing chapters, to be open to certain general criticism: With respect to psychologi-

cal testing, tests of general mental ability and tests of special aptitudes appear to have settled into rather comfortable ruts. We know that the available tests will predict certain criterion variables at *usual* levels, and we have learned to live with this, even though predictions sometimes are not very sensible—as the reviewers' comments on tests of special aptitudes indicate. The *general utility* of such tests is their greatest justification and, at the same time, an indictment of our failure to determine why they predict as they do.

With respect to achievement testing, it appears that there are no new principles being proposed for developing achievement tests. Further, the materials in the chapter on achievement testing suggest that no one is trying to define achievement—except in the obvious manner of labeling content. Apparently the *Taxonomy of Educational Objectives* (Bloom and others, 1956) has had no influence during this period. Granted, this taxonomy is incomplete, and what is available could be reworked today with some gains; it still is unfortunate that there is no active work reported that seeks to employ this scheme to limit and distinguish among definitions of achievement or to check out the relationships among the types of achievement suggested by it. We are in the doldrums!

In reading Chapter IV, one is also impressed by the absence of any mention of the notion of strategy in concept attainment. If we throw away the mentalistic aspects of this term, we see that we are talking about what should be scorable aspects of a problem-solving performance. This was recognized long ago, with the trouble-shooting and *tab* tests. Even longer ago, the Starch and Elliot (1913) study of how mathematics papers were graded clearly implied that some teachers scored the process or strategy of problem solving as well as, or perhaps rather than, the product or answer. Certainly *process* is relevant to achievement. Apparently no one is now trying to make a better place for it.

Two impressions given by the materials in this issue also suggest critical comment. The first is the utilitarian emphasis in much of the research—an emphasis that is decried by several of the reviewers. The second is some lack of concern with measurement theory.

The prediction of socially significant criteria surely is a worthy objective, given our highly structured systems of education and industry. But neither educational psychology nor industrial psychology can afford to restrict its efforts to the manufacturing of such predictions or to judge the value of its work solely in terms of these validity coefficients. The current interest in creativity has one value in suggesting that a somewhat different type of socially significant criterion may exist. Assuming that this criterion can be made manageable, the work in this field may be in danger of focusing chiefly on how to maximize the prediction of this *new* criterion. These would be useful results that would permit new predictors (and/or weights) to be incorporated into the administration of our systems. But the important—and it is important also in the sense of long-run utility—question of why the relevant predictors and/or the weights change when the criterion is changed is not thereby answered.

A second aspect of this utilitarian emphasis is the rather consistent failure of those concerned primarily with testing to raise the question of whether, and, if so, why, the relevant predictors and/or weights change as the intervening experiences are altered. In addition to being partly dependent upon the criterion, predictive validity coefficients may also be dependent upon the system of indoctrination or training—upon the intervening learning experiences. Granted that in ongoing systems the opportunities to alter these intervening experiences in some systematic way are limited; still it is a valid criticism that those interested in testing seldom make an effort in this direction. The paradigm of “test, teach, then test again” puts predictors, learning experiences, and the criterion into the same system; but to understand the system adequately demands that attention be focused on the interactions of all three components. Programed learning promises to give new or better control over these intervening experiences; if it does, studies that deliberately attempt to vary predictability (possibly attempting to reduce a well-established validity coefficient to near zero) by varying the second component should be more feasible.

These questions of why predictors behave as they do must also be answered for various strata of the population of human beings. One measure of the *utility* of personality theory is the extent to which the stratifying variables it suggests are themselves predictors or interact to yield differential prediction. But any such demonstration should have more than utilitarian value; it should also provoke the standard question: Why? There is some evidence in this issue that those concerned with personality testing see this as the fundamental question. In the chapter on projective testing, studies that attempt to relate test responses to various stimulus characteristics are reviewed; these may not pay off immediately, but they represent a point of view that is to be commended.

Finally, nowhere in the issue has anyone considered what our measurement theory—whatever that may be—was at the beginning of the period under review, and what, if anything, has been changed as a result of the work of the three years. Here and there the reviewers talk a bit about measurement theory, but there is no singling out of this topic and focusing of attention on it. Schrader's discussion of reliability is part of what is needed, as is Davis' discussion of the problem of assessing change or growth. But the test-score profile problem is abstractly the same as the growth problem, and both must be analyzed within the framework of our ideas about reliability. Part of the problem is the lack of publication of comprehensive work in the field during the period under review. Lee Cronbach's new work on measurement theory and Clyde Coombs's volume on the theory of data are yet to be formally published. But one would like to see a reviewer wrestle with Cronbach, Coombs, McQuitty, Lord, Davis, and others in an effort to show us what may be happening on this broad topic. Perhaps this will be possible in the next review of “Educational and Psychological Testing.”

Bibliography

- BINET, ALFRED, and SIMON, THÉOPHILE. *The Development of Intelligence in Children*. (Translated by Elizabeth S. Kite.) Vineland, N.J.: The Training School, 1916. 336 p.
- BLOOM, BENJAMIN S., editor. *Taxonomy of Educational Objectives, Handbook I: Cognitive Domain*. New York: Longmans, Green & Co., 1956. 207 p.
- CAMPBELL, DONALD T., and FISKE, DONALD W. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* 56: 81-105; March 1959.
- STARCH, DANIEL, and ELLIOT, EDWARD C. "Reliability of Grading Work in Mathematics." *School Review* 21: 254-59; April 1913.
- TERMAN, LEWIS M. *The Measurement of Intelligence*. Boston: Houghton Mifflin Co., 1916. 362 p.

Index to Volume XXXII, No. 1

Page citations, though made to single pages, often indicate the beginning of a chapter, section, or running discussion dealing with a topic. Starred entries indicate a major treatment of a topic.

- Ability, intellectual: distinguished from capacity, 18*; measures of, 18*
- Ability, high-level: tests of, at elementary-school level, 5
- Ability to learn: tests as measures of, 17*
- Academic major, choice of: prediction of, 36*
- Accounting: prediction of success in, 34
- ACE Psychological Examination for College Freshmen*: effect of educational achievement on, 20; factor analysis of, with achievement tests, 45; prediction of college grades, 16
- Achievement, educational: development and application of tests of, 40*
- Achievement motive: construct validity of, 71; effect of verbal instructions on, 47; measurement of, 64; relation of, to vocational choice and interests, 56; relations of measures of, 53; stability reliability of, 68
- Achievement, prediction of academic: in college, 28, 30; in college by anxiety scales, 54; in college, with discriminate function, 36; in high school, 27; in junior college, 30; long-range, with achievement tests, 43; by personality schedule, 52; from projective measures, 72, 73; by psychological inventory, 55
- Achievement tests: confusion of, with aptitude tests, 25; factor analysis of, 45*; methods of scaling, 40
- Acquiescence response set: independence of, from social-desirability set, 58; study of, 86
- Adjustment, teachers' ratings of: relation of, to anxiety scale, 54
- Administration of tests: detection of non-standard, 7; effect of method of, on projective tests, 67; studies of, 7*
- Admission, college: selection of tests for, 6
- Affiliation motive: measurement of, 64; relation of, to teacher "warmth," 73
- African universities: achievement tests for, 44
- Agreement, index of: in profile analysis, 84
- Airmen: classification of, by tests, 5
- Ambiguity: role of, in projective-testing stimuli, 69
- Analysis of variance: discussion of three-way classifications, 81
- Animal vs. human figures: in thematic cards for children, 69
- Answer sheet: as factor in speed tests, 7
- Anxiety: as factor in emotionality, 56; relation of, to Rorschach shading response, 70
- Anxiety neurotics: differentiation of, by personality questionnaire, 55
- Anxiety scales: studies of, 53*
- Anxiety, test: studies of, in relation to achievement, 46*
- Aptitude, special: development and application of tests of, 25*
- Aptitude testing: confusion of, with achievement testing, 25
- Architects: characteristics of creative, 95
- Army General Classification Test*: and prediction of military tasks, 17
- Auditory discrimination learning: group test of, 17
- Bilingualism: effect of, on test scores, 19
- Biographical data: use of, to predict creativity, 94
- Biographical inventory: use of, to predict creativity, 97
- Binomial-error model: in theory of test scores, 81
- Capacity, intellectual: measures of, 18
- Career Test Battery*: factor analysis of, 30
- California Personality Inventory*: use of, to predict creativity, 98
- California Psychological Inventory*: studies of, 55
- California Test of Mental Maturity*: interpretive information for, 10; use of, to predict grades in Japan, 19
- CEEB Scholastic Aptitude Test*: effect of educational achievement on, 20; low prediction of college grades for scholarship winners, 16; use of, with DAT to predict grades, 27
- Chance success, correction for: use of formula for, 8

- Change: assessment of, 10*
- Chemists, creative: characteristics of, 94
- Childbirth, complications in: predicted by anxiety scale, 53
- Children, disabled: new tests for use with, 22
- Children's Manifest Anxiety Scale*: use of, in research in school, 54
- Classification, differential: review and discussion of, 78*
- Clinical judgments: prediction of, 79
- Clinical vs. actuarial prediction: complete analysis plan for, 79
- Coaching: effect of, on test scores, 20
- Color vision: group test of, 32
- Concept Mastery Test*: relation of, to ratings of creativity, 92
- Configural analysis: application of, to prediction of qualitative criterion, 79
- Configural scoring: use of, in prediction, 35
- Conformity: relation of, to personality-schedule scores, 53
- Cooperative English Test*: factor analysis of, 45; interpretive information for, 10; use of, with *DAT* to predict grades, 27
- Correlation coefficient: analysis-of-variance test of, 81; sampling variances of canonical, zero-order and multiple, 80
- Correlation, canonical: new computation procedure for, 79
- Correlation, product moment: extensive empirical study of, 79
- Covariance, analysis of: large-sample procedure for two groups and two variables, 79
- Creative Process Check List: development of, 98
- Creativity: criteria of, 99*; development and application of tests of, 91*; factor analysis of tests of, 33; measures of, 71; multivariable approaches to, 94*; single-test studies of, 97*; traditional measures of, 92*
- Criteria: of creativity, 99*
- Culture-Free Test*: effect of time limits on, 20
- Davis-Eells Games*: Correlation of scores on, with socioeconomic status, 19
- Davis Reading Test*: interpretive information for, 10
- Decision theory: interpretation of scores of low reliability in, 84; relation of reliability estimation to, 81
- Defense mechanisms: assessment of, through apperceptive methods, 71; relation of, to personality factors, 57
- Delinquency: prediction of, by psychological inventory, 55
- Desirability response set: nature and magnitude of, 58
- Deviant responses: as type of response set, 59
- Dexterity tests: factor analysis of, 31
- Difference scores: proper evaluation of, 9; standard error of measurement of, 84
- Differential Aptitude Tests*: research studies of, 27*
- Discriminant function: use of, in prediction, 36; use of, to predict college dropouts, 36
- Discriminating power of test items: index of, in particular region of score range, 83; indexes of, 85
- Dissimulation: effect and control of, on personality tests, 59
- Distortion of scores, intentional: in personality tests, 59
- Divergent thinking: relation of, to creativity, 93
- Doolittle method: application and explanation of, 78
- Edwards Personal Preference Schedule*: studies of, 52*
- Eleven-plus examination, Britain's: and prediction of college grades, 16
- Elimination techniques: for building prediction batteries, 78
- Employee Aptitude Survey*: use of, to predict achievement in drafting, 29
- Environment: effect of, on intelligence, 19*
- Essay testing: problems of unreliability in grading, 42
- Examiner, intelligence-test: effect of, on scores, 20
- Extroversion: measurement of, by personality inventory, 54
- Factor analysis: of *MMPI* scales, 52; of personality questionnaires, 55; of personality schedule, 53; of personality tests, 56*; use of, with achievement tests, 45*
- Faking: effect and control of, in personality tests, 59
- FIRO-B*: studies of, 58

- Flanagan Aptitude Classification Tests*: report of five-year follow-up studies with, 31
- Follow-up study: large-scale, of World War II veterans, 36
- Foreign language aptitude: test of, 32
- General Aptitude Test Battery*: use of, to predict college achievement, 30
- Gifted child: tests for identification of, in elementary school, 5
- Gordon Personal Profile*: studies of, 56
- Grades, school: as measures of creativity, 92
- Graduate Record Examinations*: prediction of graduate performance, 16
- Group administration vs. individual administration: of TAT, 68
- Group Personality Projective Test*: as new personality test, 70
- Growth, measurement of: problems in, 10
- Guessing, correction for: study of, 8
- Guilford-Zimmerman Temperament Survey*: studies of, 55
- Guttman-scaled items: in achievement testing, 41
- Holzinger-Crowder Uni-Factor Tests*: factor analysis of, 30
- Homogeneity, coefficient of high: as criterion for achievement-test excellence, 40
- Imagery, motive-related: relation of, to motive strength, 66
- Incomplete-sentence technique: use of, to predict adjustment, 72
- Independent study: characteristics of students preferring, 73
- Inkblot technique, new: development of, 70
- Instructions: effect of, on projective testing, 67
- Intellectual skills: development and application of tests of, 15*
- Intelligence: effect of environmental variables on, 19*; relation of, to creativity, 92
- Interest inventories: as predictors of creativity, 98; studies of, 56*
- Interpersonal relations: measures of, 58
- Interpretation of test scores: bases for, 9*
- Intraclass correlation: application of, to profile-comparison problems, 84; relation of, to reliability, 82
- Iowa Tests of Basic Skills*: use of, to predict high-school achievement, 43
- Iowa Tests of Educational Development*: and prediction of college grades, 44; prediction of, in high school by elementary-school tests, 43; use of, in factor analysis, 46
- IPAT High School Personality Questionnaire*: studies of, 57
- IQ: long-term stability of, 15; relationship of, to various laboratory learning tasks, 17
- Item analysis: computing methods for, 85; studies of, 84*
- Item characteristics: theoretical work with, 83
- Item difficulties: prediction of test variance from, 83
- Item-test biserial correlation, average: relation of, to test reliability, 83
- Kindergarten: effect of early entrance to, on achievement, 45
- Knowledge of results: effect of, on WAIS scores, 20
- Kuder Preference Record*: studies of, 56; use of, to predict woodshop achievement, 29
- Kuder-Richardson formula: relation of, to test-score theory, 80; studies of, 81
- Kuhlman-Anderson Intelligence Tests*: use of, to predict woodshop achievement, 29
- Leadership roles, assumption of: relation of, to personality factors, 57
- Learning ability: tests as measures of, 17*
- Learning, paired-associate: relation of, to general verbal ability, 17
- Learning tasks, complex: prediction of performance on, by intelligence tests, 17
- Lee-Clark Reading Readiness Test*: and prediction of general reading achievement, 44
- Leiter International Performance Scale*: stability of scores on, 16
- Linear regression: as model for theory of test scores, 80; use of, to build multiple-variable prediction equations, 78
- Logistic function; use of, for estimating item parameters, 84
- MacQuarrie Test for Mechanical Ability*: use of, to predict woodshop achievement, 29
- Mathematicians: characteristics of creative, 95

- Matrices, transformed: linear functions of, 79
- Maudsley Personality Inventory*: studies of, 54
- Maze tests: review of literature on, 21
- Mean score of group: effective estimation of, 41
- Measurement, educational: students' achievement in, 44
- Measurement of Skills*: relation of, to DAT, 27
- Measurement theory: discussion of, 11*; 80*
- Mediation effect, symbolic: study of, with colors and numbers, 17
- Medical College Admission Test*: predictive and stability studies of, 33
- Medical school: prediction of success in, 33*
- Mental ability, general: development and application of tests of, 15*
- Metropolitan Achievement Tests*: studies of, 45
- Miller Analogies Test*: effect of educational achievement on, 20
- Mind: dimensions of, 93
- Minnesota Multiphasic Personality Inventory*: studies of, 51*
- Minnesota Teacher Attitude Inventory*: studies of, 56
- Motion analysis: use of, as basis for dexterity-test development, 31
- Motivation, projective measures of: use of, to predict academic achievement, 73
- Motivational device, complex: use of, to predict creativity, 98
- Motive strength: effect of, on imagery, 66
- Motor speed: in factor analysis, 32
- Multiple Aptitude Test*: use of, in prediction of junior-college achievement, 30
- Multiple-choice items, principles for constructing: effect of violation of, 40
- Multiple-choice items: preparation of, from free-response items, 6; scoring of ranking type, 85
- Multiple-regression equations: use of, in prediction, 35
- Multitrait-multimethod matrix: description of, 66, 83; use of, for evaluation of construct validity, 26
- National Board of Medical Examiners Tests*: relation of, to *Medical College Admission Test*, 33
- National Merit Scholarship Screening Test*: correlation of achievement tests with, 43
- Nelson-Denny Reading Test*: in factor analysis with DAT, 28
- Nomographs: for item analysis, 85
- Nonintelligence intellectual characteristics: relation of, to physical-sciences job success, 93
- Nonverbal tests: as measures of intellectual capacity, 18
- Norms, test: studies of, 86*
- Nursing: prediction of success in, 34
- Objectivity: of projective testing, 69*
- Occupational groups: differentiation of, by test scores, 36
- Open-book testing: comparison of, with closed-book testing, 42
- Owens-Bennett Mechanical Comprehension Test*: relation of, to creativity, 95
- Paired-comparison data: application of incomplete block design to, 80
- Parallel test: computation program for criterion of equality of, 83
- Paranoia: construct meaning of test of, 52
- Parental role: of parents of creative scientists, 94
- Parental Attitude Research Instrument*: studies of, 57
- Parents, domineering: effect of, on children's IQ-test scores, 19
- Pattern analysis: on Wechsler tests, 21
- Peer nominations: use of, to predict creativity, 99
- Perceptual-motor tests: studies of, 31*
- Perceptual speed: in factor analysis, 32
- Performance tests: as measures of intellectual capacity, 18
- Personality characteristics: inclusion of measure of, in creativity measures, 94; relation of, to achievement tests, 46*
- Personality, general dimensions of: shown by factor analysis, 56
- Personality inventories: studies of, 54*
- Personality, projective tests of: development and application of, 64*
- Personality, structured tests of: development and application of, 51*
- Phi coefficients: nomograph and table for, 85
- Physical aggression: stability of measures of, 68

- Point-biserial correlation coefficient: as index of item discrimination, 85*
- Power motive: measurement of, 64
- Practice effect: in learning-ability tests, 20; study of, on test-retest with various intervening periods, 32
- Predictability of extreme scores: over-looked in linear treatment of relationships, 16
- Prediction: by means of achievement tests, 43*: review and discussion of methods of, 78*
- Predictor: processes for selection of, 78
- Principal components: relation of, to Kuder-Richardson reliability, 82
- Problem solving: effect of anxiety on, 46
- Problem Solving Apparatus: use of, to predict creativity, 99
- Professional schools: assessment and prediction of success in, 33*
- Profile, test-score: evaluation of differences in, 9; interpretation of, 10; studies of analysis of, 83*; on Wechsler tests, 21
- Project Talent: description of, 7
- Projective tests: development and application of, 64*; relation of, to direct measures of same characteristics, 67; reliability and stability of, 68*; systematic classification of, 64
- Psychotics: discrimination of, from neurotics by test, 51
- Rank correlation, Spearman: equation for correcting ties, 79
- Rater-rater-trait matrix: handled by analysis of variance, 81
- Rating reliability: analysis-of-variance approach to, 82
- Reading competency: as factor in achievement tests, 46
- Reading retardation: relation of, to pattern of Wechsler scores, 21
- Reading-test performance: effect of test anxiety on, 47; impairment of, by periodic interruptions, 41
- Reasoning: factor analysis of tests of, 33
- Regression coefficient: characteristics of estimate of, 80
- Regression line: significance test involving extrapolation of, 79
- Relevance, test-item: difficulty and discrimination of, 40
- Reliability: logical foundation of concept of, 11; prediction of, from item characteristics, 83; sampling problems related to, 81; studies of, 81*; test of zero, 82
- Reliability formulas: relation of, to various statistical concepts, 82
- Reliability, internal consistency: as over-estimate, 11
- Reliability, stability: of projective measures, 68*; of specific tests, 15*
- Reporting of test scores: discussion of means of, 9*
- Reproducibility, coefficients of: estimates for error variance of, 82
- Research: by high-school students, 93
- Research personnel: test for selection of, 95
- Response set: effect of, on tests, 58*; studies of, 86
- Retarded children: stability of IQ scores of, 16; transfer of training in, 18
- Rorschach: modifications of, to increase objectivity, 70; scoring procedure for primary process or drive, 71; validity studies of, 67
- Sampling plans: for test norming, 87
- Scale transformations: studies of, 86*
- Scalability: of achievement tests, 41
- Scaling, test-score: studies of, 82*
- Scaling, unidimensional: of thematic pictures for aggressive content, 70
- Science-vocabulary test: use of, with activity check list to predict scientific talent, 33
- Scientists, eminent: studies of, 93
- Score fluctuation: with time of day tested, 10
- Scores, equivalent: means of obtaining, 86
- Scoring, test: problems of, 42*; special approaches to, 85; studies of, 8*
- Self-concept: of research scientists, 95
- Self-ratings: use of, to predict creativity, 99
- Sequential Tests of Educational Progress Essay Test*: reliability of grading of, 42
- Situational factors: role of, in projective testing, 67*
- Sixteen Personality Factor Questionnaire*: studies of, 55; use of, to predict creativity, 98
- Small-group discussions: characteristics of students preferring, 73
- Socioeconomic status: relation of, to creativity, 54

- Sociometric device: use of, to evaluate need satisfaction for succorance and deference, 58
- Sociometric ratings: relation of, to creativity, 96
- Speed tests: use and scoring of, 7
- SRA Mechanical Aptitudes*: use of, to predict woodshop achievement, 29
- SRA Primary Mental Abilities*: research studies of, 28*
- Standard error* of measurement: appropriate form of, for various average scores, 81; of difference scores, 84; relation of, to test length, 81
- Standardized tests: errors of teachers in scoring, 42
- Stanford Achievement Test*: errors of teachers in scoring, 42; factor analysis of, 45; homogeneity of, 41; studies of, 45
- Stanford-Binet Scale*: revision of, 21; stability of scores of, 15
- Statistical methods: for test construction and evaluation, 78*
- STEP Mathematics Test*: use of, to predict future mathematics achievement, 44
- Stimulus properties: role of, in projective testing, 69*
- Strong Vocational Interest Blank*: relation of, to creativity, 95; studies of, 56
- Structure analysis, latent: developments in, 82
- Supervisors' ratings: use of, to predict creative performance, 99
- Suppressor scale: use of, to detect faking, 59
- Summerfield-Lubin method: application and explanation of, 78
- Survey of Object Visualization*: relation of, to grades in anatomy courses, 35
- Surveys: use of thematic procedures in interviews in, 72
- Tachistoscopic thematic test: development of, 71
- Talent: national survey of, 7
- Talent, scientific: identification of, 32
- Tapping Test*: use of, to predict typing achievement, 32
- Taylor Manifest Anxiety Scale*: studies of, 53
- Teacher comments on test: effect of, on learning, 41
- Teacher "warmth": personality characteristics accompanying, 73
- Teaching methods, response to: prediction of students', with personality measures, 73
- Television: administration of tests by means of, 8
- Terman Concept Mastery Test*: relation of, to creativity, 95
- Test anxiety: effect of, on test performance, 20; relation of, to projective indicators of questionnaire measure of, 67; studies of, in relation to achievement, 46*
- Test construction: statistical methods for, 78*
- Test items measuring fact vs. interpretation: difficulty and discrimination of, 40
- Test length: relation of, to standard error of measurement, 81
- Test of Productive Thinking*: relation of, to creativity, 95
- Test results: use of, 5*
- Test scores: theory of, 80*
- Test scoring: problems of, 42*; special approaches to, 85; studies of, 8*
- Testing: effect of preannouncement of, 41
- Testing program: principles of establishing good, 6
- Testing by reading questions aloud: compared to usual procedure, 42
- Tests: bibliography of, 5; development of, 5*; specific information about, 5
- Tests, standardized achievement: guidelines for use of, 6
- Tests, survey of use of: in colleges and universities, 6; by teachers trained in guidance institutes, 6
- Thematic-apperception techniques: theoretical and methodological issues in, 65
- Thematic Apperception Test*: compilation of research on and studies of, 64*
- Transfer of training: relation of, to learning ability, 17
- True scores: discussion of, 80*
- Typing proficiency: test to predict, 32
- Validation of projective tests: method for, 66
- Validity coefficients: effect of self-selection on interpretation of, in academic selection, 35
- Validity, construct: of anxiety scale, 54; of aptitude tests, 26; discussion of, 11; method of determining, 26; of personality scale, 52; of projective tests, 65*

Validity, predictive: of specific tests, 16*

Visual Imagery test: use of, to predict creativity, 96

Visual perception: test for, with very young children, 32

Verbal vs. quantitative abilities: personality characteristics differentiating students with, 73

Wechsler Adult Intelligence Scale: factor analysis of, 21; relation of, to separate measures of learning, 21; ten-year stability of scores on, 10; use of, in prediction of college grades, 16

Wechsler Adult Intelligence Scale Vocabulary Test: use of, in factor analysis, 31

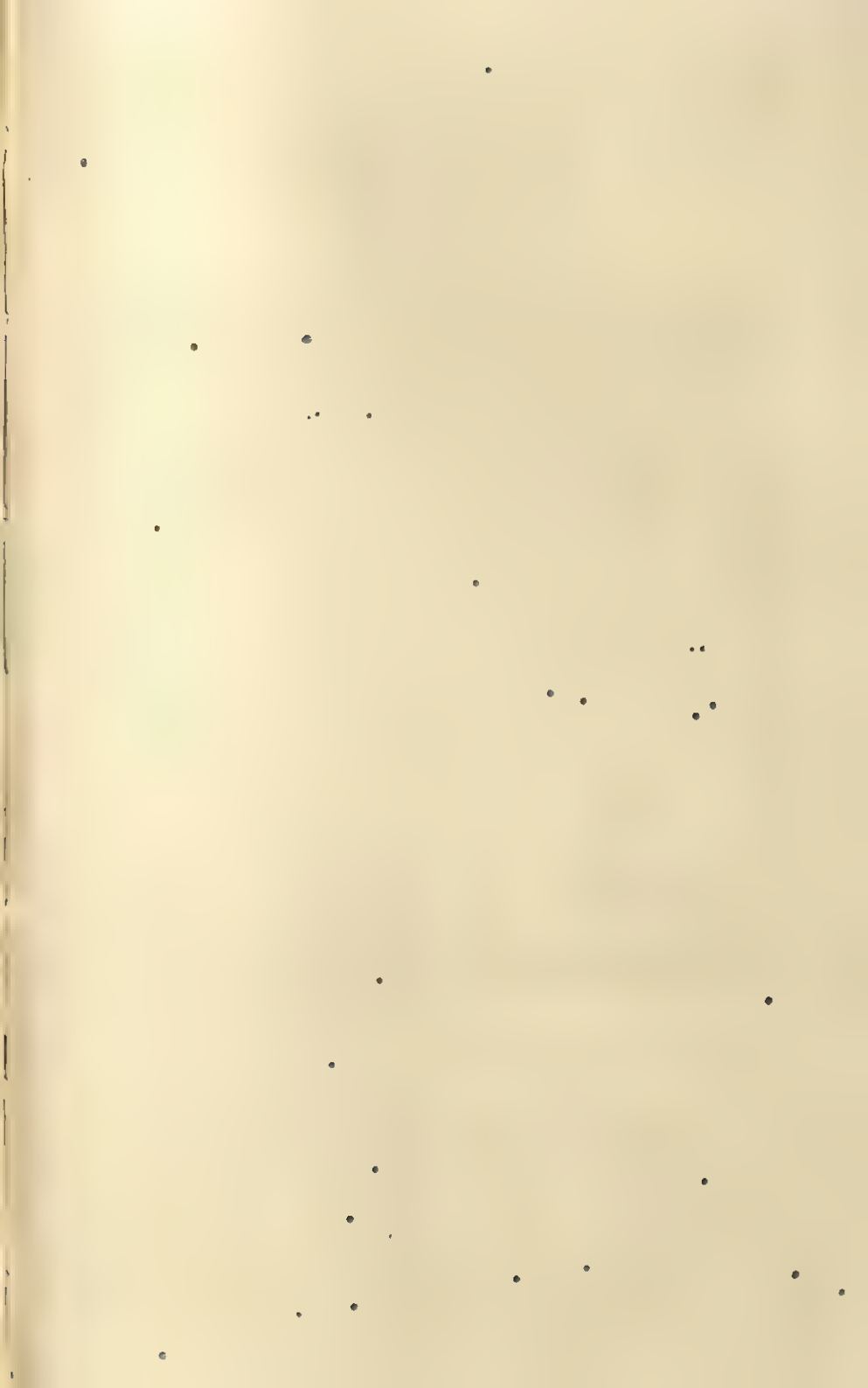
Wechsler Intelligence Scale for Children: as predictor of arithmetic comprehension, 17; review of literature on, 20; factor analysis of, 20; shortened forms of, 20

Weights, differential: study of, for test items, 86

Wherry-Doolittle method: application and explanation of, 78

Word Association Test: use of, to predict creativity, 98

Writers, creative: characteristics of, 95





REVIEW OF EDUCATIONAL RESEARCH

*Official Publication of the American Educational Research Association
Contents are listed in the Education Index.*

Copyright 1962

By National Education Association of the United States, Washington, D.C.

Volume XXXII, No. 2

April 1962

Instructional Materials: Educational Media and Technology

Reviews the literature for the six-year period
since the issuance of Vol. XXVI, No. 2, April 1956.

TABLE OF CONTENTS

Chapter	Page
Foreword	117
I. Theoretical Formulations in Audiovisual Communications.....	119
FRED HARCLEROD, <i>Alameda County State College, Hayward, California</i>	
II. Textbooks and Other Printed Materials	127
O. L. DAVIS, JR., <i>University of North Carolina, Chapel Hill, North Carolina</i>	
III. Audiovisual Materials.....	141
PAUL R. WENDT, <i>Southern Illinois University, Carbondale, Illinois</i> GORDON K. BUTTS, <i>Southern Illinois University, Carbondale, Illinois</i>	
IV. Learning from Instructional Television.....	156
WILBUR SCHRAMM, <i>The Institute for Communication Research, Stanford University, Stanford, California</i>	
V. Language Laboratories.....	168
GUSTAVE MATHIEU, <i>Orange County State College, Fullerton, California</i>	
VI. Self-Teaching Devices and Programmed Materials.....	179
HARRY F. SILBERMAN, <i>System Development Corporation, Santa Monica, California</i>	
VII. Administration of Instructional Materials.....	194
JAMES W. BROWN, <i>San Jose State College, San Jose, California</i> JOHN A. MOLDSTAD, <i>Indiana University, Bloomington, Indiana</i>	
Index	210
	115

This issue of the REVIEW was prepared by the
Committee on Instructional Materials: Educational Media and Technology

JAMES D. FINN, *Co-chairman*, University of Southern California, Los Angeles, California

WILLIAM H. ALLEN, *Co-chairman*, University of Southern California, Los Angeles, California

O. L. DAVIS, JR., University of North Carolina, Chapel Hill, North Carolina

JOHN A. MOLDSTAD, Indiana University, Bloomington, Indiana

HARRY F. SILBERMAN, System Development Corporation, Santa Monica, California

PAUL R. WENDT, Southern Illinois University, Carbondale, Illinois

with the assistance of

JAMES W. BROWN, San Jose State College, San Jose, California

GORDON K. BUTTS, Southern Illinois University, Carbondale, Illinois

FRED HARCLEROD, Alameda County State College, Hayward, California

GUSTAVE MATHIEU, Orange County State College, Fullerton, California

WILBUR SCHRAMM, The Institute for Communication Research, Stanford University, Stanford, California

FOREWORD

* The earlier issue in this cycle, published in 1956 under the title, *Instructional Materials*, was an excellent summary of the generally accepted thinking at that time. If it had a defect, it could be said that it did not sufficiently warn the reader of coming changes in the field of instructional technology. Comparison of the 1956 issue with this REVIEW is a quick way of obtaining an overview of a revolution.

If any year can be considered a bench-mark year for the beginning of the technological revolution in education, it is probably the year 1955. Educational television was beginning to take hold; B. F. Skinner had published a paper the year before, which was attracting the attention of a number of young experimental psychologists soon to be working with teaching machines and programmed learning; the language laboratory movement was underway; at research centers maintained by the Air Force at Denver and Dayton, much productive work in simulation and other technological approaches to instruction was being carried on.

The stirrings of 1955 were not reflected in the 1956 issue, which was, of course, primarily written in 1955. The result of this ferment, however, becomes obvious when the content of this REVIEW is examined in the light of the 1956 issue. The 1956 issue had five main sections devoted to (a) printed materials, (b) audiovisual materials, (c) community resources, (d) free and inexpensive materials, and (e) resource centers. Of these five sections, only two remain intact—printed and audiovisual materials. The others are either absorbed or dropped.

The events that have transpired since 1955 in the field of instructional technology have added to this issue a section on self-teaching devices and programmed materials, a section on language laboratories, and a section on instructional television. In addition, developments have caused us to include a special section on theoretical formulations in the area of audiovisual communication and to orient the content on materials centers to studies in administration and organization. Thus, the organization of the current issue reflects the almost unbelievable changes that have taken place in six years.

It would take a full-length essay to develop the reasons for this rapid change, and that temptation must be resisted in this introduction. It can be said that the causes range from the *Zeitgeist* through the rediscovery of the teaching process by experimental psychologists, the revolution in the publishing industry, the availability of foundation funds for research in solid-state physics, and the National Defense Education Act.

The current state of affairs in instructional technology is, however, not to be thought of as in equilibrium; it is far from that. The research reported here will have a certain antiquity three or six or nine years from now, when the cycle of the REVIEW returns again to this subject.

We are, perhaps, in a little better position in 1962 to predict future directions than was the 1956 committee. In an era of rapid change, as we

have been experiencing, prediction is always risky, but, at this point in time, some developments seem inevitable.

It is reasonable to expect that a future issue of the REVIEW devoted to educational media and technology will report studies in the field of computers used as teaching machines and as controls for instructional systems. Instructional systems themselves will be studied, and, perhaps, a theory of instructional systems may be developed, leading to instructional-systems engineering. The very recent development of 8mm sound motion pictures will probably direct attention back to audiovisual communication, particularly on an individual basis. Auditory and visual stimuli (and response mechanisms) may well change the current direction of programmed learning. These are but a few of the areas that will probably be covered in a future issue of the REVIEW, since all of these elements (and more) are with us in 1962, as were language laboratories, television, and programmed learning in 1955.

In conclusion, the co-chairmen would like to express their heartfelt appreciation to the contributors, who were conscientious, prompt, and, above all, more than competent.

JAMES D. FINN AND WILLIAM H. ALLEN,
*Co-chairmen, Committee on Instructional Materials:
Educational Media and Technology*

CHAPTER I

Theoretical Formulations in Audiovisual Communications

FRED HARCLEROAD

FAR-REACHING changes have taken place in both the society and education of the United States in the six-year period since the last Instructional Materials issue of the REVIEW in April 1956. The 1956 committee chairman, Frank J. Estvan, concluded that few definitive studies existed and found "uneven progress regarding the relationship of materials to educational purposes, the validity of content, technical standards of presentation, and teachability" (p. 114).

Two years later, with the passage of the National Defense Education Act of 1958, education was legally classified as essential to national defense, even though implementation and administration were reserved for the several states. The Congress' establishment of this fundamental theory, basic to current educational research, and the consequent provision of massive funds represented a development of singular importance to audiovisual research. As a result, the extensive military audiovisual research effort begun in 1941-42 has been expanded to include much of the public program of education.

Social Trends Affecting Audiovisual Research

Well-known social trends also have affected the theoretical formulations in the field of audiovisual research. Excellent statements on this subject have been recorded by Buckingham (1961), Tyler (1960), Stoddard (1957), and Mayhew (1959). They included (a) expansion of population, with a higher percentage to be served in schools; (b) changing occupational needs of society leading to expectations of new educational functions for the schools; (c) concentration of population in urban areas; (d) rapid mobility of people, including greatly expanded overseas travel; (e) unprecedented discovery, organization, and restructuring of knowledge; and (f) a nationwide demand for higher-level education, with a greater concern for "excellence" or "quality."

Major Audiovisual Theoretical Concepts

The Seminar on the Education of the AV Communication Specialist, edited by Harcleroad (1960), contained the editor's limited summary of five historically significant theoretical concepts: (a) the concrete-to-

abstract relationship, (b) the "cafeteria of materials," (c) technical theory relating to equipment itself, (d) "optimum synthesis," or "team approach," to materials production, and (e) optimum use of materials for individual learning. The last concept should also have included optimum use of materials for *group* learning.

Major newly developed or reemphasized theories appeared to be (a) development of a systems approach to instruction and application of Finn's Law—*negative entropy*—to educational systems, (b) continued effort to establish a comprehensive model of the communication process, (c) the changing role of the classroom teacher, (d) flexibility in design of spaces for learning, and (e) *total teaching* by electronic and mechanical means. Discussion of a few key research summaries, major analytical articles, and books relating to these concepts or theories follows.

Concrete-to-Abstract Relationship

In an important issue of *AV Communication Review* concerned with learning theory in audiovisual utilization, edited by Meierhenry (1961), Postman (1961) expanded the concept of concrete to abstract. The author applied McGeoch's dimensional analysis to audiovisual education and pointed out that the verbal-motor dimension, or axis, is only one of the axes to be studied.

Cafeteria of Materials

As a first step in the program under Title VII of the National Defense Education Act, Allen (1959) summarized the advantages, disadvantages, and uses of all types of media and suggested areas urgently in need of further research effort. Allen (1960) also surveyed more completely the concepts and research findings of 159 TV studies and arrived at a major conclusion that TV instruction is as effective as "conventional classroom techniques." Neal Miller and others (1957) produced the most significant single summary of research in the educational use of the motion picture and proposed many specific suggestions for additional research.

Lumsdaine and Glaser (1960) and Stolurow (1961) provided comprehensive volumes covering research on programmed learning and teaching machines. Lumsdaine and Glaser (1960) also furnished an exceedingly well-edited sourcebook of carefully analyzed, original, basic, and scattered research papers. Stolurow's excellent volume contained summaries of many of the same research papers as those found in Lumsdaine and Glaser and added a few more recent ones. Stolurow pointed out that, alone among the media, the teaching machine introduces "controlled communications" and is "the only one of the media designed specifically to teach." He also stated that "the resultant findings are more provocative than definitive" but that "a convincing array of evidence shows that machines are effec-

tive for teaching" (p. 103). These apparently opposed statements were adjacent in the text.

Technical Theory Relating to Equipment

An unusual, important, and controversial theory related to different types of media (equipment, *not* materials) has been advanced by McLuhan (1960). As he continues to refine and document his theory, it will be possible to analyze it and to determine its contribution.

Finn and Perrin (1962) reported that the development of teaching machines and programmed-learning materials had changed rapidly in a brief, two-year, period. Seven major listings of available machines, two lists from 1960 and five from 1961, were out of date. Five important references on available programs, all published in 1961, were quite incomplete and out of date. Finally, Finn and Perrin expected that their own exhaustive list would be out of date almost immediately, even though it could serve as another bench mark. Data were given for 630 programs from 50 companies in 10 fields; mathematics was most heavily represented. Data and illustrations were given for 80 different types of teaching machines and 5 classroom-communication systems.

Saettler's (1961) extensive study covered the technology of all types of media—including pictorial and graphic arts, projected still pictures, motion pictures, auditory media, television, and teaching machines—plus a brief note about facsimile.

Optimum Use of Materials for Individual and Group Learning

As Hilgard (1960) pointed out, applications of learning theory to educational technology acquired increasing importance during the period under review. Lumsdaine and Glaser (1960) brought together several dozen psychological studies and theoretical papers, all basic to use of individual self-instruction machines. Skinner's (1960) classic article, which was reproduced in the Lumsdaine-Glaser volume, emphasized the similar nature of the learning process for all organisms in spite of great phylogenetic differences. He further stressed (a) the need for greatly increased reinforcement of learned responses and (b) the need to subdivide into very small steps everything to be learned. Teaching machines take off from these two basic premises of behaviorist psychology.

Increasing dependence on, and knowledge of, psychological theory and its relationship to use of various media led, ultimately, to the previously cited volume edited by Meierhenry (1961), "Learning Theory and AV Utilization." Five of its chapters were written by psychologists selected with care to represent different theoretical points of view.

A key point, however, for audiovisual research theory was in the area of motivation. Glaser (1961) tended to minimize motivation as an un-

testable or nontranslatable concept. On the other hand, Deese (1961) wrote that McDonald's (1961) concern for motivational properties of audiovisual devices should not be neglected and that motivation might well be their "specific function." These few sentences cannot sufficiently reflect the volume's implications. A coherent and adequate theory of learning may be far closer than it generally appears.

Systems Approach and Finn's Law

Norberg (1961) suggested that a systems approach to the use of media in education, when adequately developed and properly related to an adequate theory of learning, could effect noteworthy changes in educational-media research. Robert Miller (1954) and Carpenter (1960) have described, respectively, the component parts of a man-machine system and the application of such a system to teaching and learning. Stolurow (1961) based his entire approach to automated teaching on a need for more efficiency and a systems approach to instruction.

Finn (1955, 1960) has devoted more time and attention to this topic than any other person in the audiovisual field. Finn (1960) listed general administration, testing, and instruction as the three areas in which technology is, and can be, applied. In instruction, complete systems can be developed in physics, geometry, and other subjects. Similarly, the classrooms and schools of a district and their total instructional program can be much more highly organized and standardized. Finn (1960) proposed that the law of negative entropy will apply in more complex situations. He further stated that introduction of more complicated hardware—such as Stratovision, closed-circuit television, and computer-controlled teaching machines—will lead to tighter organization, more emphasis on organization, and adherence by teachers to the prior planning by outside experts or groups of specialists in the district or state. All of this systematized organization will lead to less teacher-student control of classroom learning and more interdependence on outside-the-classroom sources.

Finn (1960) pointed out the dangers inherent in such an educational or audiovisual theory and the need to plan for teacher or student independence and creative effort within any such system. In a similar vein, Buckingham (1961) emphasized that creativity is uneven and noncontinuous in its development and that the Europeans have conveyed the impression that teaching by mass methods tends, in effect, to be indoctrination. Another example of concern about the systems approach was a masterly critique by Dale (1961). Dale divided educational activities into two parts, "imitative reaction" and "creative interaction," and stressed the importance of both in a total educational program. In Dale's view the first can be preprogrammed as part of a prepared system and is "dependent" learning, whereas the second is "self-programmed," "independent" learning. A large area for research in the next few years will be the relation between creative learning and the systems approach.

Models of the Communication Process

Implicit in articles on the systems approach was a more highly developed model of the communication process. In the area of audiovisual communication Gerbner's (1956) model and King's (1961) expansion of it were probably most significant. Gerbner (1959) proposed (both verbally and graphically) a 10-step model, research problems appropriate to each step, and a value-oriented triangular model of knowledge in communication terms. He also described a course, taught over several years, in which he attempted to teach students a method of approach and study that reflects his model. King applied Floyd Allport's "event-structure theory" to Gerbner's model and suggested that the next step would be to apply Allport's concept of "meaning" to this model.

Changing Role of the Teacher

The Ford Foundation (1961) reported that televised courses were more carefully planned than conventional courses and that the combined efforts and skills of studio and classroom teachers produced a better teaching effort than either could achieve alone. Stoddard (1957), Mayhew (1959), and Trump (1959) predicted a change in the composition of the instructional staff either with or without different roles for special and general teachers, assistants to teachers, and others. Allen (1960) suggested that television and films might take over some present teacher functions, such as direct presentation of facts, leaving the classroom teacher with more time to devote to those facets of the instructional process that demand human interaction, such as assessing learning of individual students and directing pupil reactions.

Flexibility in Design of Learning Spaces

Trump (1959), Stoddard (1957), Mayhew (1959), and many other writers suggested a revised, flexible approach to building educational plants to make most effective use of new media and new concepts of the role of the teacher. Ramo (1960) proposed a highly automated, push-button type of educational facility designed to adapt mechanized, computer-controlled classrooms to individual learning needs of students. These reports were, basically, theoretical proposals dependent on future research to prove or disprove their efficiency, productivity, adaptability, and value.

Hauf and others (1961), however, analyzed from an architectural and engineering point of view the available aids and media and information and research related to designing learning spaces. They found that media (equipment) have been developed primarily for commercial uses, are too complicated and not sufficiently dependable, have been uncoordinated in development, and have high comparative costs. Their own impressive and

valuable study provided an analysis of "flexibility" and methods of providing for it. They also provided extensive material on such items as lighting and light control, rear-view projection, and acoustics, plus extensive design studies on different types of materials-production centers and learning spaces.

Total Teaching by Electronic or Mechanical Means

For the future, Ramo (1960) proposed the automated, computer-controlled, electronic system of total teaching mentioned above, as well as a completely new industry to provide the hardware. Allen (1959, 1960) stated that a few studies indicated specifically prepared film materials were not "aids to teachers," but performed the entire teaching task. Learning from these materials was "as effective as conventional instruction" (1959, p. 87). Since research in systems for total teaching is just beginning, most educators will probably not accept the idea until it is framed more definitely than it can be at present.

Conclusion

In the past six years major changes and additions took place in advancement of audiovisual theory. A few key summaries and articles have been selected to document the enormity of the changes and the radical shifts in emphasis. Impetus for the changes came from the determination of Congress that public education has become a first-line item in national defense.

Continuance of this concern appears probable. The next three to five years may well see an even greater emphasis on audiovisual research and an even closer relationship with psychologists and their work in developing a theory of human learning.

Bibliography

- ALLEN, WILLIAM H. "Research on New Educational Media: Summary and Problems." *Audio-Visual Communication Review* 7: 83-96; Spring 1959.
- ALLEN, WILLIAM H. *Television for California Schools*. Bulletin of the California State Department of Education, Vol. 39, No. 4. Sacramento, Calif.: the Department, April 1960. 48 p.
- BUCKINGHAM, WALTER. *The Impending Educational Revolution*. Washington, D.C.: National Education Association, 1961. 42 p.
- CARPENTER, C. R. "Approaches to Promising Areas of Research in the Field of Instructional Television." *New Teaching Aids for the American Classroom*. Stanford, Calif.: Institute for Communication Research, 1960. p. 73-94.
- DALE, EDGAR. "No Room for Amateurs." *Audio-Visual Instruction* 6: 190-92; May 1961.
- DEESE, JAMES. "Comment and Summary: A Mine of Possible Applications." *AV Communication Review*, Vol. 9, Supplement No. 5. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. p. 79-87.

- FINN, JAMES D. "A Look at the Future of AV Communication." *Audio-Visual Communication Review* 3: 244-56; Fall 1955.
- FINN, JAMES D. "Automation and Education: III. Technology and the Instructional Process." *AV Communication Review* 8: 5-26; Winter 1960.
- FINN, JAMES D., and PERRIN, DONALD G. *Teaching Machines and Programed Learning, 1962: A Survey of the Industry*. Occasional Paper No. 3, Technological Development Project. Washington, D.C.: National Education Association, 1962. 85 p. (Offset)
- FORD FOUNDATION and FUND FOR THE ADVANCEMENT OF EDUCATION. *Teaching by Television*. Second edition. New York: the Foundation, January 1961. 87 p.
- GERBNER, GEORGE. "Toward a General Model of Communication." *Audio-Visual Communication Review* 4: 171-99; Summer 1956.
- GERBNER, GEORGE. "Education and the Challenge of Mass Culture." *Audio-Visual Communication Review* 7: 264-78; Fall 1959.
- GLASER, ROBERT. "Learning and the Technology of Instruction." *AV Communication Review*, Vol. 9, Supplement No. 5. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. 96 p.
- HARCLEROAD, FRED F., issue editor. "The Education of the AV Communication Specialist." *AV Communication Review*, Vol. 8, Supplement No. 2. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1960. 96 p.
- HAUF, HAROLD D., and OTHERS. *New Spaces for Learning*. Troy, N.Y.: School of Architecture, Rensselaer Polytechnic Institute, 1961. 79 p. plus Design Studies.
- HILGARD, ERNEST R. "Learning Theory and Its Applications." *New Teaching Aids for the American Classroom*. Stanford, Calif.: Institute for Communication Research, 1960. p. 19-26.
- KING, WILLIAM A. "Communication Theory and the Allport Concept of Structure." *AV Communication Review* 9: 119-28; March-April 1961.
- LUMSDAINE, ARTHUR A., and GLASER, ROBERT, editors. *Teaching Machines and Programmed Learning*. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. 724 p.
- MCDONALD, FREDERICK J. "Motivation and the Communication Processes." *AV Communication Review*, Vol. 9, Supplement No. 5. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. p. 57-67.
- MCLUHAN, H. MARSHALL. *Report on Project in Understanding New Media*. Urbana, Ill.: National Association of Educational Broadcasters, June 1960. 235 p.
- MAYHEW, LEWIS B. *New Frontiers in Learning*. Columbia, Mo.: Stephens College, 1959. 38 p.
- MEIERHENRY, WESLEY C., editor. "Learning Theory and AV Utilization." *AV Communication Review*, Vol. 9, Supplement No. 5. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. 88 p.
- MILLER, NEAL E., and OTHERS. "Graphic Communication and the Crisis in Education." *Audio-Visual Communication Review* 5: 1-120; No. 3, 1957.
- MILLER, ROBERT B. *Some Working Concepts of Systems Analysis*. Pittsburgh: American Institute for Research, February 1954. 6 p. (Offset)
- NORBERG, KENNETH D. "The First of the Title VII Reports—A Review." *Research Abstracts and Analytical Review of Completed Projects: National Defense Education Act, Title VII, Installment I*, 5-14. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, 1961. 32 p.
- POSTMAN, LEO. "Human Learning and Audiovisual Education." *AV Communication Review*, Vol. 9, Supplement No. 5. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. p. 66-78.
- RAMO, SIMON. "A New Technique in Education." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 367-81.
- SAETTLER, L. P. *History of Instructional Technology, II: The Technical Development of the New Media*. Occasional Paper No. 2, Technological Development Project. Washington, D.C.: National Education Association, 1961. 68 p. (Offset)

- SKINNER, BURRHUS F. "The Science of Learning and the Art of Teaching." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 99-113.
- STODDARD, ALEXANDER J. *Schools for Tomorrow: An Educator's Blueprint*. New York: Fund for the Advancement of Education, 1957. 62 p.
- STOLUROW, LAWRENCE M. *Teaching by Machine*. U.S. Department of Health, Education, and Welfare, Office of Education, Cooperative Research Monograph No. 6. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1961. 173 p.
- TRUMP, J. LLOYD. *Images of the Future*. Washington, D.C.: National Association of Secondary-School Principals, a department of the National Education Association, 1959. 48 p.
- TYLER, RALPH. "Social Trends, and Problems for Tomorrow's Schools." *New Teaching Aids for the American Classroom*. Stanford, Calif.: Institute for Communication Research, 1960. p. 3-9.

CHAPTER II

Textbooks and Other Printed Materials

O. L. DAVIS, JR.

THE MEDIUM of print is the principal form of educational communication. So acknowledged, one might expect to find an abundance of research evidence on the characteristics of the medium, its effectiveness under varying conditions and for different purposes, its improvements, its role and impact in the school process, and its relationships with other media. Some aspects of this medium and its tradition have been carefully and systematically studied; other aspects have received little research attention.

The advent of newer instructional media, principally television and autoinstructional devices, is forcing serious attention to the role of the print medium in schools. McLuhan (1960) appealed to educators to understand the reality and complexity of our multimedia culture and to adjust teaching and instructional-media usage to the present age. The traditional relationship of the textbook to the school curriculum has been described by Gwynn (1960) and by other curriculum authorities. The changing role of the print medium in our society and in the schools has not, however, received sufficient attention.

Two seminars held by the Association for Supervision and Curriculum Development (1959, 1960) contributed to the development of a much-needed theory of instructional materials. These seminars explored the relations of different media with each other in systems, and the emerging roles of media, including print, in the school curriculum. The rationale and suggestions for research on printed text materials presented by Cronbach (1955) should receive continued attention as researchers and curriculum specialists give renewed serious study to printed materials.

Available studies of textbooks and printed materials were reviewed by Otto and Flournoy (1956) in the last issue of the REVIEW devoted to instructional materials. Since that issue, Hockett (1959) and Buckingham (1960) have dealt with studies on this topic. This chapter reviews research reports about textbooks and printed materials that have appeared during the past six years. A necessary delimitation is the exclusion of studies dealing with school libraries.

Analysis of Content

Considerable research effort has been expended on the analysis of the substantive content of textbooks. Few researchers, however, have studied the messages of other printed materials used in schools. Most content analyses of textbooks are characterized by surveys, catalogs, and analyses

of treatment of topics in different books of the same subject field, or in representative books in a field during a fixed period of time, or both. Nietz's (1961) recent volume not only analyzed the content of pre-1900 American school books, but also presented much information regarding textbook production and use, textbook authors, and specific textual variables. Future analyses of text content will also profit from attention to Foshay's (1960) paper on the nature of the educational message.

Language Arts

After comparing the most-used modern reading series with the 1879 edition of the McGuffey series, Hollins (1959) concluded that modern American readers were not frivolous and deficient in educative values. The two series compared were found to have identical types of content with one exception: the category of religion was not in the modern readers. Stories in basal readers about cultures outside of the United States were analyzed by Smith (1959). She found that picturesque minority groups were depicted in many stories, that out-of-date customs were presented as present-day practices, and that some stories portrayed the foreign children behaving as if they were American children. Studying American high-school literature books, Lewis (1956) concluded that little of the material about foreign peoples and cultures provides a true picture of modern life in foreign lands. Gleason (1958) found that Catholic secondary-school literature books were oriented toward old immigrants, Caucasians, and middle-class and upper-class Catholics, and that positive values were ascribed to rural conditions and negative values to urban life. Clyse (1959) reported that third-grade basal readers have more stories about farming than any other occupation and that only a few types of jobs were treated in the stories found in the books.

Dunning (1959) presented a method for selecting and using junior novels in the English program. After studying simplified classics, which he found varying widely in length and readability, Baker (1960) urged that such adaptations receive neither blanket approval nor blanket condemnation. Alm (1954) maintained that books written for and about adolescents contained both true and false assumptions concerning human experience. According to Julian (1956), junior-college literature anthologies were useful in teaching values. Malmstrom (1958) compared textbook statements about certain grammatical items to findings of geographical research in American linguistics. She found both divergence and congruence between textbook statements and actual usage.

Social Studies

Researchers noted various deficiencies in the treatment of certain topics, terms, and generalizations in social studies textbooks. Epstein (1956) con-

cluded that social studies texts do not present an adequate treatment of the supremacy of law in American life. Palmer (1960) found that high-school history texts do not contribute significantly to an understanding of social change. Krug (1961) concluded that the study of the post-Civil War Reconstruction period in U.S. history textbooks was not consistent with findings of recent historical scholarship and urged that textbook accounts of this period be rewritten. Treatment of foreign affairs in junior high-school U.S. history textbooks has increased since 1865, according to a study by Gilbert (1955). While observing that current social studies texts treat the subject of Asia more adequately than their predecessors, Robbins (1961) noted the need for continued improvement. Kennedy (1960) concluded that elementary and junior high-school social studies textbooks gave rather extensive treatment to certain aspects of life, such as occupations, transportation, and homes, in Moslem nations, India, and Israel, but allotted little attention to the early history, education, arts, and recreation of these countries. Wilson (1958) found that although intermediate-grade geographies contained more quantitative terms than other social studies textbooks at this level, the amount of quantitative content did not progress evenly, and quantitative terms in social studies texts were generally found in arithmetic books of the same grade level. Uneven attention was given to social studies generalizations in the textbooks studied by Dimitroff (1958).

Mathematics and Science

Mauro (1957) noted considerable similarity in 10 series of arithmetic textbooks with regard to grade placement, sequence, and techniques of presentation. He reported greatest differences in the various methods of introducing new subskills. Bhargava (1956) found considerable diversity in the scope and sequence of computational programs in books of the same series and among different series. Neither of the two arithmetic series studied by Hensell (1956) made extensive use of knowledge of children's interests with respect to the kind and range of problems in the books. Dooley (1959) found that research results and recommendations of national committees have generally effected changes in arithmetic textbooks.

Currently used chemistry textbooks were found deficient by Harriman (1960) in keeping up with developments in the field of chemistry. Similarly, Rajaratnam (1957) concluded that new ideas of variable, function, equation, and equality were mixed with outworn and erroneous ideas and terminology in the elementary algebra books she surveyed. Text materials are being prepared, field-tested, and revised as part of current curriculum projects in mathematics and the sciences. First editions of the texts reveal that some traditional topics are omitted and that topics drawn from recent scholarship in the fields are included. The National Council of Teachers of Mathematics (1961), highlighting developments in the mathematics curriculum, described textbook revisions in that field.

Censorship

Instances of local censorship of books used in schools occurred throughout the period covered by this REVIEW. The NEA's National Commission for the Defense of Democracy Through Education (1960) and the American Book Publishers Council (1960) reported several cases of banning of novels used in English classes. Several professional associations urged vigilance with regard to pressure groups advocating that certain books be banned from the schools. No national censorship crusade was mounted, however. While the American Legion has been an effective censorship group at times during the past 20 years, O. E. Jones (1957) observed that this organization no longer analyzes and criticizes textbooks.

Textual Variables

In addition to the message in printed communications, various textual variables are also important and may be investigated. Studies of readability, typography, style, illustration, and design are reviewed in this section. Research on reading-interest factors, reviewed by Lepere (1961), is not considered here.

Readability

The concept of readability and readability formulas received continued research attention during this period. Chall (1956) reviewed readability research and concluded that readability formulas have limited value as rules for writing. The author pointed out that simplified vocabularies and sentence structures have facilitated comprehension, but principally when other elements were also altered. In their factor analysis, Brinton and Danielson (1958) confirmed the importance of word length and sentence length to readability. They also identified factors related to stylistic devices and sentence complexity. Groff (1959) concluded that a readability formula was an inadequate criterion of difficulty of printed materials. A new readability formula was proposed by Tribe (1957), and a simplified index of abstraction was reported by Gillie (1957). Uses of "slope procedure" in determining readability were reviewed by Taylor (1956).

Readability studies of school textbooks substantiated previous research findings that difficulty levels varied greatly among books of the same series and similar books for the same course. Sloan (1959) found readability grade placement coinciding with publishers' assignments in only half the intermediate-grade social studies textbooks he analyzed. In addition, Sloan observed no more than three textbooks at any grade level with appropriate levels of reading difficulty for activities, questions, and projects materials. Mallinson, Sturm, and Mallinson (1957) concluded that recently published science texts were difficult to read. Glott (1955) found no evidence of a progressive increase in difficulty in graded

arithmetic textbooks, but did observe that arithmetic textbooks and workbooks did not present a vocabulary burden beyond the grade level intended for the materials. The reading difficulty of a selected number of mass-circulation magazines was assessed by Allias (1956). Since most of the magazines had tenth-grade and eleventh-grade difficulty ratings, he concluded that wage earners were capable of reading beyond their educational age. Although she did not apply an objective readability formula to the materials she studied, Kinnunen (1957) concluded that digest articles were no easier to read than the original versions. A similar finding was made by Marshall (1956) with regard to textual material in physics. In his study, students who read a rewritten passage did not differ significantly in their comprehension from those who read the unaltered passage from a standard textbook. Klare, Shuford, and Nichols (1957) found that an easier style in technical materials produced higher scores than a difficult style, with regard to words per fixation, words per second, and recall.

Kingdon (1957) found no significant differences in fourth-graders' comprehension of the story form or factual form of social studies materials. Further, he found that children had no special preference for either form. Rockowitz (1957) found that the least readable of four world-history textbooks was the most widely used in New York City. He also concluded that advanced readers were more concerned with format and unfavorable factors of content, whereas retarded readers were more concerned with unfavorable stylistic factors.

In addition to readability, the specialized vocabulary in economics textbooks was studied by Zahniser (1955) and in business-law textbooks by Goodman (1956). Both investigators concluded that most specialized words appear consistently and are only slightly more difficult than the general vocabulary. Haffner (1959) found that fifth-grade social studies textbooks presented more difficult vocabulary than sixth-grade books and concluded that social studies textbooks at both grade levels contained excessive vocabulary loads and concept burdens. Millis (1959) analyzed fifth-graders' oral responses to 20 terms emphasized in their social studies textbook. He found that over 70 percent of the responses were correct or partially correct and recommended that textbooks use terms several times and in a variety of situations.

Typography

Important implications for the production of printed materials were revealed by several studies of typography. Tinker (1957) found that the rate of reading print on a curved surface is significantly slower than for flat copy and recommended that publishers use wider margins in large books and magazines to diminish effects on reading of curvature of the page. Several researchers studied the effects of square-span, spaced-unit, and conventional typographic styles. Nahinsky (1956), using a compre-

hension criterion, found the square-span style superior to other styles. Klare, Nichols, and Shuford (1957) concluded that the square-span and spaced-unit styles may have advantages over conventional typographic arrangement. They found that the square-span style slowed readers initially but that readers gained speed with practice. Coleman and Kim (1961) reported that conventional style was read faster than a vertical typographic arrangement in long passages, although there was no significant difference in comprehension. They further noted that the vertical, spaced-unit, and square-span styles were significantly superior to the conventional style when passages were presented in a tachistoscope series. Affirming the merits of new typographic arrangements, they concluded that readers must be trained to read these new arrangements before the advantages will be realized. Experimental evidence of the use of these newer typographic styles in printed educational materials should be forthcoming, but is not now available.

Another lead for educational researchers was pointed out by Haskins (1958), who found a "type face appropriateness" for articles on different topics in the *Saturday Evening Post*. Syllabified print produced better word pronunciation than did standard print, but did not affect intermediate-grade children's vocabulary, speed, and comprehension, according to Rettke (1958). He also found that high achievers read standard print better but that low achievers read better with syllabified print.

Illustration and Design

Significant questions about the usefulness of pictures in facilitating comprehension of printed materials were raised by two studies. Weintraub (1960) alternately presented three classes of second-graders with text only (picture covered), text and pictures, and pictures only. His finding that comprehension was greatest under the "text only" condition held for the group as a whole, for boys and girls separately, for poor readers, and for high-IQ low achievers in reading. Similar results were obtained by Burdick (1959), employing high-school science materials. He compared students' comprehension of a text passage (a) illustrated by cross-sectional drawings, (b) illustrated by perspective cutaway drawings, and (c) without illustrations. He concluded that neither type of drawing contributed significantly to comprehension. Useful in interpreting these results are the generalizations about achieving the potential of pictorial illustrations, presented by Spaulding (1956). Additional research evidence is needed to determine the situations in which various types of illustrations contribute to comprehension.

Programmed Textbooks

Recent developments in autoinstructional devices and in programming materials are treated in another chapter of this REVIEW. Little research

attention has been given to aspects of these devices and programs related to the print medium. Since, for example, most programs are printed, investigations of such variables as readability, typography, content analysis, illustrations, and use are appropriate. Some research has been conducted with regard to the utilization of the book format as both device and program. The development of the programmed textbook (Glaser, Homme, and Evans, 1960) and the scrambled book (Crowder, 1959) have resulted. A number of such textbooks are currently on the market. Only a few studies of the effectiveness of programmed textbooks have been reported. Eigen and Kohnoski (1960) found no significant learning differences between students using programmed books and those using teaching machines. Lawson, Burmester, and Nelson (1960) reported higher achievement for natural science students using a scrambled text than for those using a conventional text. Reed and Hayman (1961) found a programmed textbook in high-school English grammar to be most effective with high-achieving students.

Using Printed Materials

The correct use of text materials is a matter of considerable importance in education. Various proposals have been advanced, but only a few have been subjected to research. The suggestion that a multiple-textbook approach was superior to the single-text approach was not substantiated by a study by Schneider (1957). In his experimental study at the fourth-grade level, he found no significant differences between these two approaches in terms of subject-matter acquisition in the social studies. The multiple-text approach did result, however, in better work-study skills and understandings. In intermediate-grade reading instruction, however, Causey (1957) found that children using a variety of basal readers and supplementary books developed better reading skills than children using a single basal reader and workbook.

Newman (1957) compared three conditions of presenting information, including various ways of using and not using textbooks in high-school biology, and found no significant differences among the approaches. Learners' preferences among modes of presentation are relatively unimportant, according to a study by James (1958). Airmen who indicated a preferred mode of presentation (reading, lecture, or no preference) were divided into two groups and presented with either a reading assignment or a tape-recorded lecture. Employing a factorial analysis of variance design, James concluded that reading was superior to the lecture for presentation of complex material. Schminke (1960), studying the effective use of a classroom current-events magazine, found no significant differences in utilization between a limited systematic approach and a supplemental systematic approach. Jones (1958) reported that specially prepared study guides used by individual pupils had the same practical value as the usual types of teacher-directed activities.

Workbooks

The use of workbooks continued to be studied. Sartain (1957) found that low-ability third-grade groups using reading workbooks learned more vocabulary than similar groups doing extra activities, but the results were equivocal for subgroups in upper-ability levels. He concluded that growth in general word recognition was not related so much to the use of reading workbooks as to unidentified factors in the instructional situations. Haynes (1959) found no significant differences in reading achievement between first-graders who did not use reading workbooks but who engaged in many concrete experiences, and other beginning readers who were taught with reading workbooks. In another study (Docter, 1960), elementary-school children using reading workbooks in grades 2, 3, and 4 achieved significantly higher comprehension and vocabulary scores than non-workbook groups. At the first-grade level, the non-workbook group was favored; no significant differences were observed in grades 5 and 6. Most teachers and administrators favored workbooks, in the belief that these materials saved teacher time and provided challenging materials to the pupils. Durr (1958) found that elementary pupils using arithmetic workbooks made greater gains in the vocabulary of arithmetic and in fundamental operations than children who did not use workbooks.

Trade Books

Popularity of individualized reading programs increased. Central in such programs was the availability of trade books that children can read and will enjoy. Griese (1960) found that American publishers are providing an adequate supply of readable books for intermediate-grade and junior high-school levels, but not for the primary grades. Demonstrating a procedure useful to curriculum groups and library committees, Russell (1961) evaluated 10 easy trade books for primary children. He found the books varying widely in format, difficulty, and literary merit. Also, he compared them to primers and preprimers on the bases of difficulty and of amount and variety of material.

Paperback Books

Paperback book publishing and use increased. Advocates of the use of paperback books in schools displayed enthusiasm for this development, but the use of paperback books has been subjected to little research. Blum (1959) pointed out that 75 percent of all paperback titles in print in 1955 were reprints, and most titles were the works of established authors. Blum noted, further, that better-quality paperback titles are usually priced higher than most paperback volumes and are therefore less readily available to the public. Paperback book sales for school use in 1958, while numerically large, amounted to perhaps one-thirtieth of the total sales of the industry (Zamchick, 1958).

Textbook Availability

Cummings and Mackintosh (1958) prepared a useful survey of textbook-selection responsibilities and requirements of state departments of education. A UNESCO-sponsored conference (International Conference on Public Education, 1959) dealt with various problems related to primary-school textbooks. Ray (1957) recommended procedures for improving Alabama's textbook program, including proposals that local school units be permitted to adopt books not on the approved list and that the state provide free textbooks for all grade-levels. Turner (1959) noted that Florida was one of only two states adopting single textbooks for secondary schools and one of four states adopting single textbooks for elementary schools. He concluded, in part, that Florida's system did not make available to schools text materials for use with pupils of differing abilities and interests. The NEA Research Division (1959) reported that free textbooks were provided to pupils in most urban school districts. When provided free to pupils, texts were usually bought by the state in the South and by local districts in the Middle Atlantic and New England states. More than 30 percent of the urban districts did not provide books for high-school students, and more than 13 percent of these districts did not buy books for elementary-school pupils.

Conclusion

Significant developments in curriculum and in the use of instructional media are foretold by events of the recent past. Print in the schools may go unexamined as educational-media researchers neglect traditional media in order to give increased attention to the newer media. Hopefully, such a situation will not occur. Many problems connected with print as a communication medium, in textbooks and other materials, have persisted too long. Empirical studies, while important, will contribute little of the research information that can help clarify these problems. Needed is much more experimental research using school children and youth as subjects and designed and analyzed with sophisticated techniques.

Bibliography

- ALLIAS, MARCUS T. *The Reading Difficulty of a Selected Set of Leading Mass Magazines*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 100 p. Abstract: *Dissertation Abstracts* 17: 57-58; No. 1, 1957.
- ALM, RICHARD S. *A Study of the Assumptions Concerning Human Experience Underlying Certain Works of Fiction Written for and About Adolescents* (Parts I and II). Doctor's thesis. Minneapolis: University of Minnesota, 1954. 1044 p. Abstract: *Dissertation Abstracts* 16: 2343-44; No. 12, 1956.
- AMERICAN BOOK PUBLISHERS COUNCIL. *Censorship Bulletin* 4: 1-16; June 1960. (Parts 1 and 2.)
- ASSOCIATION FOR SUPERVISION AND CURRICULUM DEVELOPMENT. *A Report of Proceedings of an ASCD Seminar on a Theory of Instructional Materials*. Washington, D.C.: the Association, a department of the National Education Association, 1959. 105 p. (Mimeo.)

- ASSOCIATION FOR SUPERVISION AND CURRICULUM DEVELOPMENT. *A Report of Proceedings of an ASCD Seminar on a Theory of Instructional Materials*. Washington, D.C.: the Association, a department of the National Education Association, 1960. 115 p. (Mimeo.)
- BAKER, IRVING D. *An Evaluation of the Simplified Classics*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1960. 123 p. Abstract: *Dissertation Abstracts* 21: 558-59; No. 3, 1960.
- BHARGAVA, SUMITRA. *An Analysis and Comparison of the Scope and Sequence of the Computational Programs in Selected Arithmetic Textbooks*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1956. 259 p. Abstract: *Dissertation Abstracts* 16: 1083-84; No. 6, 1956.
- BLUM, ELEANOR. "Paperback Book Publishing: A Survey of Content." *Journalism Quarterly* 36: 447-54; Fall 1959.
- BRINTON, JAMES E., and DANIELSON, WAYNE A. "A Factor Analysis of Language Elements Affecting Readability." *Journalism Quarterly* 35: 420-26; Fall 1958.
- BUCKINGHAM, B. R. "Textbooks." *Encyclopedia of Educational Research*. Third edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. p. 1517-24.
- BURDICK, JOHN G. *A Study of Cross-Section Drawings Used as Technical Illustrations in High School Science Textbooks*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1959. 92 p. Abstract: *Dissertation Abstracts* 20: 2707-2708; No. 7, 1960.
- CAUSEY, MARJORIE E. *A Comparative Study of Reading Growth: Enriched Versus a Limited Program of Instruction*. Doctor's thesis. Bloomington: Indiana University, 1957. 102 p. Abstract: *Dissertation Abstracts* 18: 956; No. 3, 1958.
- CHALL, JEANNE S. "This Business of Readability: A Second Look." *Educational Research Bulletin* 35: 89-99, 111-12; April 11, 1956.
- CLYSE, JUANITA. "What Do Basic Readers Teach About Jobs?" *Elementary School Journal* 60: 456-60; May 1959.
- COLEMAN, EDMUND B., and KIM, INSUP. "Comparison of Several Styles of Typography in English." *Journal of Applied Psychology* 45: 262-67; August 1961.
- CRONBACH, LEE J., editor. *Text Materials in Modern Education*. Urbana: University of Illinois Press, 1955. 216 p.
- CROWDER, NORMAN A. "Automatic Tutoring by Means of Intrinsic Programming." *Automatic Teaching: The State of the Art*. (Edited by Eugene Galanter.) New York: John Wiley & Sons, 1959. Chapter 10, p. 109-16.
- CUMMINGS, HOWARD H., and MACKINTOSH, HELEN K. "Textbook Selection and State Requirements." *Curriculum Responsibilities of State Departments of Education*. U.S. Department of Health, Education, and Welfare, Office of Education, Misc. No. 30. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1958. Chapter 4, p. 20-26.
- DIMITROFF, LILLIAN M. *A Quantitative-Qualitative Analysis of Selected Social Science Generalizations in Social Studies Textbooks in the Intermediate Grades*. Doctor's thesis. Evanston, Ill.: Northwestern University, 1958. 593 p. Abstract: *Dissertation Abstracts* 19: 2518; No. 10, 1959.
- DOCTER, ROBERT L. *An Investigation of the Effectiveness of Reading Workbooks at the Elementary Level*. Doctor's thesis. Los Angeles: University of Southern California, 1960. 266 p. Abstract: *Dissertation Abstracts* 21: 1458-59; No. 6, 1960.
- DOOLEY, SISTER MARIE C., R.S.H.M. *The Relation Between Arithmetic Research and the Content of Elementary Arithmetic Textbooks, 1900-1957*. Doctor's thesis. Los Angeles: University of Southern California, 1959. 422 p. Abstract: *Dissertation Abstracts* 20: 562-63; No. 2, 1959.
- DUNNING, ARTHUR S. *A Definition of the Role of the Junior Novel Based on Analyses of Thirty Selected Novels*. Doctor's thesis. Tallahassee: Florida State University, 1959. 356 p. Abstract: *Dissertation Abstracts* 20: 2641; No. 7, 1960.
- DURR, WILLIAM K. "The Use of Arithmetic Workbooks in Relation to Mental Abilities and Selected Achievement Levels." *Journal of Educational Research* 51: 561-71; April 1958.
- EIGEN, LEWIS D., and KOMOSKI, P. KENNETH. "Research Summary Number 1." *Automated Teaching Project*. New York: Collegiate School, 1960. 28 p. (Mimeo.)
- EPSTEIN, CHARLOTTE. *The Concept of Supremacy of Law in Educating for Democratic Citizenship*. Doctor's thesis. Philadelphia: University of Pennsylvania, 1956. 184 p. Abstract: *Dissertation Abstracts* 16: 896; No. 5, 1956.
- FOSHAY, ARTHUR W. "What Is the Message?" *Saturday Review* 43: 35, 58-61; February 13, 1960.

- GILBERT, JOHN H. *Changes of the Twentieth Century in the Treatment of Foreign Affairs Since 1865 by U.S. History Textbooks for the Seventh and Eighth Grades*. Doctor's thesis. Madison: University of Wisconsin, 1955. 430 p. Abstract: *Dissertation Abstracts* 16: 714-15; No. 4, 1956.
- GILLIE, PAUL J. "A Simplified Formula for Measuring Abstraction in Writing." *Journal of Applied Psychology* 41: 214-17; August 1957.
- GLASER, ROBERT; HOMME, LLOYD E.; and EVANS, J. L. "An Evaluation of Textbooks in Terms of Learning Principles." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by A. A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 437-45.
- GLEASON, SISTER MARY L., C.S.J. *A Study of Intergroup Relations as Revealed by Content Analysis of Literature Textbooks Used in Catholic Secondary Schools*. Doctor's thesis. St. Louis, Mo.: St. Louis University, 1958. 269 p. Abstract: *Dissertation Abstracts* 19: 2804-2805; No. 11, 1959.
- GLOTT, RALPH. *An Investigation of the Verbal Matter in Recently Published Arithmetic Textbooks and Workbooks for the Intermediate Grades*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1955. 118 p. Abstract: *Dissertation Abstracts* 16: 477-78; No. 3, 1956.
- GOODMAN, DAVID G. *A Study of the Readability of High School Business Law Textbooks*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 109 p. Abstract: *Dissertation Abstracts* 17: 61-62; No. 1, 1957.
- GRIESE, ARNOLD A. *The Readability of Children's Literature Published in the United States During the Period June 1956 Through June 1958*. Doctor's thesis. Tucson: University of Arizona, 1960. 173 p. Abstract: *Dissertation Abstracts* 21: 496-97; No. 3, 1960.
- GROFF, CHARLES D. *A Semantic Study of Selected Supplementary Readers Used in the Primary Grades*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1959. 423 p. Abstract: *Dissertation Abstracts* 20: 1666; No. 5, 1959.
- GWYNN, J. MINOR. "The Influence of the Textbook." *Curriculum Principles and Social Trends*. Third edition. New York: Macmillan Co., 1960. Chapter 8, p. 206-37.
- HAFFNER, HYMAN. *A Study of Vocabulary Load and Social-Concept Burden of Fifth and Sixth Grade Social Studies, History, and Geography Textbooks*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1959. 158 p. Abstract: *Dissertation Abstracts* 20: 4311-12; No. 11, 1960.
- HARRIMAN, VERNON J. *The Inclusion of Modern Chemistry in Current Secondary School Chemistry Textbooks*. Doctor's thesis. Columbia: University of Missouri, 1960. 130 p. Abstract: *Dissertation Abstracts* 21: 1423; No. 6, 1960.
- HASKINS, JACK B. "Testing Suitability of Typefaces for Editorial Subject-Matter." *Journalism Quarterly* 35: 186-94; Spring 1958.
- HAYNES, MILO. *The Effect of Omitting Workbook-Type Reading Readiness Exercises on Reading Achievement in the First Grade*. Doctor's thesis. Nashville, Tenn.: George Peabody College for Teachers, 1959. 167 p. Abstract: *Dissertation Abstracts* 20: 968; No. 3, 1959.
- HENSELL, KENNETH C. *Children's Interests and the Content of Problems of Arithmetic*. Doctor's thesis. Palo Alto, Calif.: Stanford University, 1956. 186 p. Abstract: *Dissertation Abstracts* 16: 1857; No. 10, 1956.
- HOCKETT, JOHN A. "Materials of Instruction." *Review of Educational Research* 29: 177-84; April 1959.
- HOLLINS, WALTER H. *A Comparative Content Analysis of a Sample of McGuffey and Modern Elementary School Readers*. Doctor's thesis. Urbana: University of Illinois, 1959. 233 p. Abstract: *Dissertation Abstracts* 20: 3124; No. 8, 1960.
- INTERNATIONAL CONFERENCE ON PUBLIC EDUCATION. *Primary School Textbooks; Preparation, Selection, Use*. UNESCO. International Bureau of Education, Geneva, Publication No. 204. New York: Columbia University Press, 1959. 245 p.
- JAMES, NEWTON E. *Influence of Learner's Choice on the Effectiveness of Alternate Modes of Presentation of Learning Material*. Doctor's thesis. Minneapolis: University of Minnesota, 1958. 182 p. Abstract: *Dissertation Abstracts* 19: 88-89; No. 1, 1958.
- JONES, ANNIE L. *Graded Study Guides for Sixth Grade Social Studies*. Doctor's thesis. Boston: Boston University School of Education, 1958. 223 p. Abstract: *Dissertation Abstracts* 19: 2027; No. 8, 1959.

- JONES, ORVILLE E. *Activities of the American Legion in Textbook Analysis and Criticism, 1938-1951*. Doctor's thesis. Norman: University of Oklahoma, 1957. 184 p. Abstract: *Dissertation Abstracts* 17: 2908; No. 12, 1957.
- JULIAN, WILLIAM R. *The Teaching of Values Through Literature in the Junior College*. Doctor's thesis. Stanford, Calif.: Stanford University, 1956. 263 p. Abstract: *Dissertation Abstracts* 16: 1859; No. 10, 1956.
- KENNEDY, LEONARD M. *The Treatment of Moslem Nations, India, and Israel in Social Studies Textbooks Used in Elementary and Junior High Schools of the United States*. Doctor's thesis. Pullman: Washington State University, 1960. 170 p. Abstract: *Dissertation Abstracts* 21: 498-99; No. 3, 1960.
- KINGDON, FREDERICK H. *A Comparison of the Achievement of Fourth Grade Pupils Using Factual and Story Forms of Social Studies Material*. Doctor's thesis. Boulder: University of Colorado, 1957. 137 p. Abstract: *Dissertation Abstracts* 19: 253; No. 2, 1958.
- KINNUNEN, SYLVIA H. *A Comparison Between the Readability of Digest and Original Versions of Articles*. Doctor's thesis. Ann Arbor: University of Michigan, 1957. 162 p. Abstract: *Dissertation Abstracts* 18: 1303; No. 4, 1958.
- KLARE, GEORGE R.; NICHOLS, WILLIAM H.; and SHUFORD, EMIR H. "The Relationship of Typographic Arrangement to the Learning of Technical Training Materials." *Journal of Applied Psychology* 41: 41-45; February 1957.
- KLARE, GEORGE R.; SHUFORD, EMIR H.; and NICHOLS, WILLIAM H. "The Relationship of Style Difficulty, Practice, and Ability to Efficiency of Reading and to Retention." *Journal of Applied Psychology* 41: 222-26; August 1957.
- KRUG, MARK M. "On Rewriting of the Story of Reconstruction in the U.S. History Textbooks." *Journal of Negro History* 46: 133-53; July 1961.
- LAWSON, CHESTER A.; BURMESTER, MARY A.; and NELSON, CLARENCE H. "Developing a Scrambled Book and Measuring Its Effectiveness as an Aid to Learning Natural Science." *Science Education* 44: 347-58; December 1960.
- LEPERE, JEAN M. "Literature in the Elementary School." *Review of Educational Research* 31: 179-87; April 1961.
- LEWIS, CHARLES S. *The Treatment of Foreign Peoples and Cultures in American High School Literature Books*. Doctor's thesis. Ann Arbor: University of Michigan, 1956. 195 p. Abstract: *Dissertation Abstracts* 17: 1255-56; No. 6, 1957.
- MCLUHAN, MARSHALL. "Electronics and the Changing Nature of Print." *AV Communication Review* 8: 74-83; September-October 1960.
- MALLINSON, GEORGE G.; STURM, HAROLD E.; and MALLINSON, LOIS M. "The Reading Difficulty of Some Recent Textbooks for Science." *School Science and Mathematics* 57: 364-66; May 1957.
- MALMSTROM, JEAN. *A Study of the Validity of Textbook Statements About Certain Controversial Grammatical Items in the Light of Evidence from the Linguistic Atlas*. Doctor's thesis. Minneapolis: University of Minnesota, 1958. 491 p. Abstract: *Dissertation Abstracts* 19: 1306-1307; No. 6, 1958.
- MARSHALL, JAMES S. *The Relationship Between Readability and Comprehension of High School Physics Textbooks*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1956. 127 p. Abstract: *Dissertation Abstracts* 17: 64; No. 1, 1957.
- MAURO, CARL. *A Survey of the Presentation of Certain Topics in Ten Series of Arithmetic Textbooks*. Doctor's thesis. College Park: University of Maryland, 1957. 337 p. Abstract: *Dissertation Abstracts* 17: 1515-16; No. 7, 1957.
- MILLIS, GEORGE H. *Fifth-Grade Pupils' Understanding of Terms Encountered in Their Social Studies Texts*. Doctor's thesis. Urbana: University of Illinois, 1959. 115 p. Abstract: *Dissertation Abstracts* 20: 224-25; No. 1, 1959.
- NAHINSKY, IRWIN D. "The Influence of Certain Typographical Arrangements upon Span of Visual Comprehension." *Journal of Applied Psychology* 40: 37-39; February 1956.
- NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS. *The Revolution in School Mathematics*. Washington, D.C.: the Council, a department of the National Education Association, 1961. 90 p.
- NATIONAL EDUCATION ASSOCIATION, NATIONAL COMMISSION FOR THE DEFENSE OF DEMOCRACY THROUGH EDUCATION. "The Dangerous Shears." *Defense Bulletin* No. 85, 1960. Washington, D.C.: the Association, June 1960. p. 1-5.
- NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *Textbook Provisions in 624 Urban School Districts*. Education Research Service Circular No. 6, 1959. Washington, D.C.: the Association, August 1959. 35 p.

- NEWMAN, EARL N. *A Comparison of the Effectiveness of Three Teaching Methods in High School Biology*. Doctor's thesis. Norman: University of Oklahoma, 1957. 84 p. Abstract: *Dissertation Abstracts* 17: 2940; No. 12, 1957.
- NITZ, JOHN A. *Old Textbooks*. Pittsburgh: University of Pittsburgh Press, 1961. 364 p.
- OTTO, HENRY J., and FLOURNOY, FRANCES. "Printed Materials." *Review of Educational Research* 26: 115-24; April 1956.
- PALMER, JOHN R. *The Treatment of Social Change in High School History Textbooks*. Doctor's thesis. Urbana: University of Illinois, 1960. 245 p. Abstract: *Dissertation Abstracts* 21: 1479; No. 6, 1960.
- RAJARATNAM, NAGESWARI. *A Study of Some Concepts in Algebra as Used by Writers of High School Text Books*. Doctor's thesis. Urbana: University of Illinois, 1957. 155 p. Abstract: *Dissertation Abstracts* 18: 532-33; No. 2, 1958.
- RAY, FRANCIS M. *Determination of Possible Improvements in Alabama's Textbook Program*. Doctor's thesis. Auburn: Alabama Polytechnic Institute, 1957. 245 p. Abstract: *Dissertation Abstracts* 18: 914-15; No. 3, 1958.
- REED, JERRY E., and HAYMAN, JOHN L., JR. *Report of Research, Denver Public Schools' English 2600 Study*. Denver, Colo.: Denver Public Schools, 1961. 18 p. (Mimeo.)
- RETTKE, GORDON H. *The Effect of Syllabified Print on Four Aspects of Reading*. Doctor's thesis. Bloomington: Indiana University, 1958. 210 p. Abstract: *Dissertation Abstracts* 19: 1017-18; No. 5, 1958.
- ROBBINS, JOHN. "The New Asia and American Education." *Teachers College Record* 62: 339-47; February 1961.
- ROCKOWITZ, MURRAY. *Student Liking for Textbooks in Relation to Their Readability*. Doctor's thesis. New York: New York University, 1957. 118 p. Abstract: *Dissertation Abstracts* 18: 502-503; No. 2, 1958.
- RUSSELL, DAVID H. "An Evaluation of Some Easy-To-Read Trade Books for Children." *Elementary English* 38: 475-82; November 1961.
- SARTAIN, HARRY W. *The Effect of Workbook Use on Reading Growth of Third Grade Groups at Two Levels of Ability*. Doctor's thesis. Minneapolis: University of Minnesota, 1957. 301 p. Abstract: *Dissertation Abstracts* 18: 1743; No. 5, 1958.
- SCHMINKE, CLARENCE W. *A Study of the Effective Utilization of a Classroom News Magazine in Teaching Current Events*. Doctor's thesis. Iowa City: State University of Iowa, 1960. 236 p. Abstract: *Dissertation Abstracts* 21: 1874-75; No. 7, 1961.
- SCHNEIDER, FREDERICK W. *An Experimental Study Comparing the Effects of the Multiple Textbook Approach and the Single Textbook Approach to Elementary School Social Studies*. Doctor's thesis. Boulder: University of Colorado, 1957. 218 p. Abstract: *Dissertation Abstracts* 19: 97-98; No. 1, 1958.
- SLOAN, FRED A., JR. *Readability of Social Studies Textbooks for Grades Four, Five, and Six, as Measured by the Dale-Chall Formula*. Doctor's thesis. Nashville, Tenn.: George Peabody College for Teachers, 1959. 481 p. Abstract: *Dissertation Abstracts* 20: 928-29; No. 3, 1959.
- SMITH, MILDRED M. *An Analysis of Basal Reader Stories with Cultural Settings Outside Continental United States*. Doctor's thesis. Bloomington: Indiana University, 1959. 249 p. Abstract: *Dissertation Abstracts* 20: 4313; No. 11, 1960.
- SPAULDING, SETH. "Communication Potential of Pictorial Illustrations." *Audio-Visual Communication Review* 4: 31-46; Winter 1956.
- TAYLOR, WILSON L. "Recent Developments in the Use of 'Cloze Procedure.'" *Journalism Quarterly* 33: 42-48, 99; Winter 1956.
- TINKER, MILES A. "Effect of Curved Text upon Readability of Print." *Journal of Applied Psychology* 41: 218-21; August 1957.
- TRIBE, EDWARD B., SR. *A Readability Formula for the Elementary School Based upon the Rinsland Vocabulary*. Doctor's thesis. Norman: University of Oklahoma, 1957. 87 p. Abstract: *Dissertation Abstracts* 17: 788-89; No. 4, 1957.
- TURNER, FRED W. *A Study of the Current Practices in Administering the Selection and Adoption Procedures of Free Textbooks with Special Reference to Florida*. Doctor's thesis. Tallahassee: Florida State University, 1959. 426 p. Abstract: *Dissertation Abstracts* 20: 3167-68; No. 8, 1960.
- WEINTRAUB, SAM. *The Effect of Pictures on the Comprehension of a Second Grade Basal Reader*. Doctor's thesis. Urbana: University of Illinois, 1960. 92 p. Abstract: *Dissertation Abstracts* 21: 1428-29; No. 6, 1960.

- WILSON, GILBERT M. *Quantitative Content in Elementary School Social Studies Textbooks*. Doctor's thesis. Nashville, Tenn.: George Peabody College for Teachers, 1958. 104 p. Abstract: *Dissertation Abstracts* 19: 2816; No. 11, 1959.
- ZAHNISER, KENNETH C. *The Readability of Economic Textbooks*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1955. 129 p. Abstract: *Dissertation Abstracts* 16: 84; No. 1, 1956.
- ZAMCHICK, DAVID, editor. "Problems in Paperback Publishing." *English Journal* 47: 562-65; December 1958.

CHAPTER III

Audiovisual Materials

PAUL E. WENDT and CORDON E. BUTTS

INCREASINGLY in recent years, research in audiovisual materials and methods of teaching has been paced by the rapid rise of television, language laboratories, and programmed instruction, all of which have now won their place in other chapters of this issue of the REVIEW. Research in the administration of audiovisual materials, including facilities and equipment, and in motion-picture production is also not covered in this chapter. The studies reviewed are organized in somewhat the same manner as in the April 1956 REVIEW chapter by Allen (1956) in that the general headings, Effectiveness of Audiovisual Materials, Learner Characteristics, and Utilization, are employed.

A few specialized summaries are useful. Research studies completed, so far, under Title VII of the National Defense Education Act were reviewed by Norberg (1961) and by VanderMeer (1961) in two issues of *AV Communication Review*. Moldstad (1961) reported on doctoral dissertations in the audiovisual field. Literature on training aids was summarized by Saul and others (1957). An indexed bibliography of human engineering reports was published by the Special Devices Center (1956). May and Lumsdaine (1958) wrote on their series of experiments on films and still pictures. Greenhill (1957) brought together research in the Instructional Film Research program on the use of films in clinical psychology.

Effectiveness of Audiovisual Materials

In spite of the diversion of much research talent into investigating television and programmed instruction, considerable research is still being carried on, with novel emphasis, in the regular audiovisual means of instruction. Emphasis in this chapter is placed on the major studies, as measured by conclusiveness and scope.

Motion Pictures

Increasing attention has been paid to testing the effectiveness of long series of films planned to be used in sequence and often providing a major part of classroom instruction. Wendt and Butts (1960) tested a series of 54 films on world history in grade 9 classes in seven schools. In each school, one teacher taught an experimental class and a control class. The experimental classes saw the films; the control classes did not. In all other respects, each teacher attempted to treat her control and her

experimental class alike. The seven schools ranged from moderately large to moderately small. While the control classes took the usual full year to complete the course, the film classes covered the same subject matter in one semester. A criterion test in the subject given immediately at the end of instruction showed no significant difference between control and experimental classes. Cottle (1960) did an auxiliary study in this same situation and found the effect of the world-history films was equally good for both high and low achievers.

Anderson and Montgomery (1959) tested a series of 162 physics films in 16 classes in one experimental and one control school. No significant difference was found between the two groups on a criterion test. The authors hypothesized that the lack of difference may have resulted from the superior training of the control teachers. Noall and Winget (1959) conducted a similar experiment with the same series, as part of the staff-utilization studies of the National Association of Secondary-School Principals. They used three large, three medium, and four small schools as the experimental group and a similar grouping of schools for control. Too much variation among schools hampered analysis, but among the medium-sized schools the control classes were significantly better. No significant difference was determined by a criterion test in the larger or the smaller schools. There were no differences by ability levels. The authors concluded that the films did not improve instruction but that they were as good as classroom teaching. There seemed to be an over-all loss of interest in the field of physics in the experimental group. The same series of physics films was tested by Wittich, Pella, and Wedemeyer (1960). There were no significant differences in achievement between the experimental and control groups in immediate recall, but after three months, the particular control group incorporated to assess a possible Hawthorne effect retained more. What was interpreted as a Hawthorne effect seemed to increase the scores of the control group.

Another series of 160 chemistry films (each of 30-minute duration) was investigated by Anderson, Montgomery, and Moore (1961). They used 590 high-school students in 33 classes with nine teachers. Of 17 comparisons, 8 favored the nonfilm group, whereas 3 favored the film group. In a similar study, Popham and Sadnavitch (1961) used 149 physics films and 132 chemistry films. Six schools served for the filmed physics and nonfilmed chemistry instruction and six schools for the nonfilmed physics and filmed chemistry. The investigation concluded that the achievement performance of the nonfilm group in physics was significantly superior to the film group. There was no significant difference between the two groups in chemistry. For neither series was there a significant interaction of teacher method with the level of student intelligence. Although all students in both subjects showed a more unfavorable attitude toward both subjects at the conclusion of the study than at the beginning, the attitudes of members of the film groups were significantly more unfavorable than those of students of the nonfilm groups. Sadnavitch and

Popham (1960) have also reported upon an attitude scale developed particularly for filmed courses.

Schenberg (1961) used the chemistry series for the in-service training of 19 chemistry teachers. He concluded that films can improve the effectiveness of instruction of both experienced and inexperienced teachers and that correct use of the films would raise the level of supervision. Smith and Anderson (1958) made a further analysis of data of a previously reported experiment showing a significant achievement increase from films for high-ability and low-ability students, but not for the group of intermediate ability. They hypothesized that this difference might have resulted from different learnings. Therefore, they divided their criterion test items into *fact* items and *principle* items and reran the statistical analysis. They found no significant difference.

It might be noted that the flurry of experiments involving long series of films was a far cry from the early days of film experimentation, when it was somehow presumed that the showing of one film might have a measurable effect on the achievement of students. Teaching by television undoubtedly inspired the creation of some of these film series; in fact, the physics film series was a direct by-product of broadcasting. The question that had persisted over the years—what a teacher would be able to accomplish with pupils if he had all the films he needed—was answered in part by this familiar *saturation* experiment. Judging from feelings of teachers and pupils resulting from all the physics and chemistry film-series research, the saturation point was exceeded when 30 minutes of film was shown each day for many months.

S. Cohen (1960) provided a fifth-grade teacher with 14 pieces of equipment and noted that the use of audiovisual materials increased almost ninefold. In the college setting, Caspers (1956) found that achievement gains increased with the number of films used in a psychology course.

An investigation of films used with special film readers and a magnetic sound-track projector was carried out by Witty and Fitzwater (1957) with grade 2 children in six schools. Regular instruction was used in the first semester; integrated audiovisual materials were added in the second. A somewhat greater gain in reading skill was made during the experimental period than during the control period. There were also other benefits, such as faster reading rate, more related reading, more class discussion, and evidence of learning to work more effectively.

The very intensive use of films not only provided a test of the saturation hypothesis but also tended to change the status of films from a supplementary aid to a complement to the work of the live teacher. Duval and others (1960) taught two technical courses in the Navy without the presence of instructors. One course consisted of 4 half-hour lessons recorded on slides with tape-recorded commentary; the other was recorded in 21 half-hour sound motion pictures. Each course was also taught by an instructor. In both cases, the recorded instruction was as effective as

the regular instruction and acceptable to the trainees, although they preferred a live instructor. The cost of the sound motion pictures, produced economically, was less than for the slides and tape. This experiment reaffirms the results of a few previous studies, which indicated that motion pictures, at least in certain circumstances, could assume the total teaching load. Although earlier research also showed that the effectiveness of a film could be much increased through proper utilization by a live teacher, considerations of economy might suggest giving up this added benefit and letting the films speak for themselves.

The evaluation of films for the teaching of skills represented a continuation of the research in these areas during the previous decades. Stein (1958) used film loops for instruction in beginning typing at the high-school level. The film-loop class typed more rapidly, but the control class typed more accurately; both differences were very significant.

Drury (1959) taught beginning tumbling to college freshmen by instructor demonstration, by drawings, and by motion pictures. Four easy and four difficult stunts were taught to all classes. The author found no differences traceable to difference in method or degree of difficulty of the stunt; but he also found that increasing the number of showings in successive class periods was more effective than just one showing, especially with the easier stunts. Hirsch (1957) tested eight 8-minute films on aspects of marksmanship, available on continuous projectors, to trainees on the rifle range as compared to the efforts of the best instructors. The results were nonsignificant, possibly because the superiority of the instructors narrowed the difference.

In the study of visual aids in dental training, Yock and Erlandson (1958) taught part of the porcelain jacket and crown technique by three methods: film alone, demonstration alone, and film and demonstration together. The combined film and demonstration method was significantly better than the film-alone method, which might possibly be explained by the very small groups of eight or nine who saw the demonstrations, in contrast to the customary large demonstration groups.

Filmstrips, Slides, and Transparencies

Dworkin and Holden (1960) compared four 15-minute sound filmstrips with a regular classroom lecture for 120 graduate engineering students in two matched groups. The teacher who gave the classroom lecture also wrote and recorded the filmstrip script. There was no significant difference in learning between the two methods, although 40 percent of the filmstrip students wished that they could have asked questions. A comparison of commercial filmstrips with illustrations cut from magazines was made by Sprague (1955) in sixth-grade and seventh-grade science classes. No differences were found by material or by sex, and no differences by level except that high-level students learned more from the commercial filmstrip. McBeath (1961) used 20 sixth-grade classes matched in four groups on

four variables to test these ways of presenting a sixth-grade social studies lesson: (a) a silent captioned filmstrip, (b) a captioned filmstrip with a recorded narration, (c) a 16mm sound filmograph, and (d) a sound filmstrip with a filmograph sound track. On immediate and delayed retention tests, there were no significant differences among the four methods. But further analysis showed interaction between sex and method: the highest gains were scored by boys who saw the captioned filmstrip with narration, the lowest gains by girls who saw the filmograph.

In a basic study of the nature of learning from photographs, Lubin and Wilson (1956) used six black-and-white and six color pictures showing handicapped children. These were shown to an experimental group of 20 severely handicapped children and also to 20 normal children. Each child was asked to write a story about each picture, and the score was a numerical count of the words in each story. The verbal productivity of the handicapped children was significantly higher than that of the normal children, presumably because of the closer identification with the children in the pictures. The handicapped group also showed more reaction than the normal group to the color pictures, but only if the color pictures were presented second and not first.

Variations in mode of representation of pictures were also tested by Ryan and Schwartz (1956). Their four modes consisted of a photograph, a shaded drawing, a line drawing, and a cartoon. The criterion of effectiveness was the speed of recognition of details in the picture. Photographs were made of the following: (a) a human hand in four different positions; (b) a row of five electrical knife switches, with a different switch closed in each of four pictures; and (c) a cutaway model of the valves of a steam engine at four different stages of the cycle. Each of the resulting 12 photographs was copied in (a) line drawing, (b) shaded drawing, and (c) cartoon. All 48 pictures were then reduced to 2 x 2-inch slides and projected tachistoscopically in an ascending series of longer exposures. The presentation was randomized. The results showed that the recognition rank orders were significantly different, as follows: the cartoon was best and the line drawing worst; the photograph and shaded drawing were about equal.

Goehring (1956) developed a feasible film-slide test to measure the ability at the college level to apply scientific method to the area of mechanics in high-school physics. Chance (1961) used 200 transparencies and 800 overlays in teaching engineering descriptive geometry to freshmen engineering students, 104 of whom were divided between this method and the usual instruction with the chalkboard. The transparency group did significantly better at the end of the course than the chalkboard group. Moreover, it was determined that approximately 15 minutes of each 60-minute class lecture could be saved by the transparency medium. As indicated by the total number of questions, attentiveness was greater in the experimental group. Both instructors and students preferred this method.

Two types of transparencies, static and animated, were used by Silverman (1958) to teach facts about three kinds of firearms to 150 male college students. The animated devices were classified by the number of moving parts. The same tape-recorded lectures were given to all groups. No differences between static and animated transparencies were observed with a paper-and-pencil test, but significant differences did appear with the performance tests. The number of moving parts in the animated transparencies did not make a difference.

Pictorial Illustration and Graphic Materials

Experimentation with still pictures during the period under review showed promising increased interest in more basic research in production variables and in what might be called the psychological characteristics of pictures, as well as continued interest in field studies in classrooms. Boyd and Mandler (1955) tested the reactions of grade 3 children to animal and human stories in pictures. Each child was asked to write a story about each picture, and the stories were analyzed by eight variables of productivity and indexes of ego-involvement. Although 74 percent of the children preferred animal over human stories, statistical analysis showed that the human stories had much greater effect on the eight variables. Bloomer (1960) showed fourth-, fifth-, and sixth-graders pictures varying in three styles and three themes. The styles were line drawing, shaded drawing, and color wash drawing. The picture themes were pleasant, unpleasant, or neutral. Preference was for color, pleasant, and neutral pictures. However, when asked to write stories, most students selected the line drawings and the unpleasant pictures as subjects.

Ferguson (1959) made a tape recording of the free responses of 60 nursery-school and kindergarten children to 10 pictures of common objects such as a horse, a train, and a dog. Action pictures elicited, roughly, twice as many responses as nonaction pictures; the qualitative analysis of the words used showed the action pictures also elicited a larger number of verbs.

Weintraub (1960) studied the effects on selected reader-comprehension abilities of stories for a basal reader presented to five classes of grade 2 children without pictures, with pictures but without text, and with both pictures and text. The result favored the first presentation at the 5-percent level of significance. Further analysis revealed, surprisingly, that it was the poor readers who contributed mainly to this difference.

A statistically valid and reliable scale of photographs was developed by Byrom (1957) to be used for the appraisal of learning influences in industrial-arts shops. In teaching engineering drawing, Hepler (1957) found that orthographic projection followed by a pictorial presentation was superior to pictorial presentation followed by orthographic projection.

Declarative, imperative, and interrogative captions on still pictures were tested by Butts (1956) in grade 8 classes in six schools. The pictures

were identical in every other respect. The declarative captions were found to be significantly better than the other two.

Tannenbaum and Fosdick (1960) reported one of the few studies on the effect of photographic technique on still pictures. In this study, Fosdick used four angles of lighting on four subjects and had 14 sections of college students rate them on a semantic-differential scale. In the evaluation, only the 45-degree angle was significantly different. The authors stated that "the original suspicion that lighting from below would create an unfavorable judgment proved to be unfounded" (p. 259).

Two studies were concerned with the process of identification in looking at pictures. Bevan, Secord, and Richards (1956) had 15 male college-fraternity members rate full-face photographs of each other on 29 facial characteristics. They were also asked to identify the person in their group they would (a) most like to be and (b) least like to be. The control group consisted of 15 similar students at another university. No significant differences were found in any of the comparisons. The authors concluded that neither liking nor disliking had an effect on perception of the features as shown in the photographs. Working with a rather small sample of 15 men and 16 women in a small liberal arts college, Chambers (1957) confirmed his hypothesis that persons tend to like photographs of individuals who they believe have traits like their own and to dislike those who appear to have opposite traits.

Controlled experimentation with graphics still remains meager except for four studies reported by Vernon (1957a, b, c, d). The subjects ranged from elementary-school children to boys and girls aged 15 to 19 and included members of the Air Force. Three of Vernon's four experiments showed no advantage for using charts, graphs, or pictures with a text; at the very least, a text should accompany the graphical methods. Vernon found that, contrary to the popular impression, considerable intelligence and education were needed to learn from graphs and charts. Mixed results were obtained by Glazener (1958) in using charts to teach beginning mechanical drawing. Richter (1956) asked subjects to draw charts used in biology and found that the accuracy with which the charts were prepared did have some relationship to both the amount and quality of learning of biological subject matter.

Recordings and Radio

The rise of language laboratories seems to have spurred experimentation with tape recordings, whereas radio has been overshadowed by the dominance of television. Another of the projects of the National Association of Secondary-School Principals was reported by Gibson (1960). Grade 7 spelling was taught by tape alone over a public-address system to some members of 15 classes; their classmates served as a control. The difference in favor of the tape method alone was highly significant, but further

analysis showed this to be almost entirely due to the presence of high-ability groups; the low-ability groups did not profit from tape recordings.

Popham (1961) played 34 taped college lectures to 55 students divided between experimental and control groups and matched by the *Miller Analogies Test*. Each taped lecture was followed by 20 minutes of discussion. There was no significant difference in teaching facts about research, research interpretations, or research design.

Employing 296 high-school students in 10 classrooms to test auding ability in English and German, Gideon (1956) used tapes, pictures, and records in the experimental sections. She found that the teaching method employed made no significant difference in the results but that the audio-visual materials provided an interesting focus for students.

The value of tapes when used only for lesson reviews was studied by Edgerton (1961). Classroom lectures totaling 826 minutes were made available to 229 trainees. About one-half of the trainees listened to the reviews, but showed no superiority in the course examinations. Newman and Highland (1957) taught radio to Air Force trainees for five days through use of supervised reading by recordings integrated with the workbook and by recordings accompanied by slides. No important differences were noted, but the length of the lessons may have had an important influence. Johnston (1961) compared tape recordings teamed with large posters, with conventional instruction involving lectures and laboratory in a college class in general psychology lasting 12 weeks and consisting of 18 sections. Each of the four instructors taught both an experimental and a control section to control the teacher variable. The conventional method proved superior to the experimental one.

Three-Dimensional Materials

An experimental and a control group of pupils in grade 5 were set up by Erickson and Chow (1961) to test some effects of using portable typewriters. It was found that their use did not affect academic achievement or spelling, but there was a significant improvement in capitalization, punctuation, speed of composition, and quantity of written work. Similarly, Reddell and DeVault (1960) used an abacounter, a calculator, and teacher-made aids to help children in grade 5 with arithmetic over a five-month period. The dependent variables were (a) measure of arithmetic reasoning, (b) fundamentals, and (c) general achievement. In reasoning and achievement, the two commercial devices were significantly better; but in fundamentals, the abacounter was superior to the other two methods.

In training students to thread a 16mm sound projector, Trubov (1956) found that it was important to give a lecture on the principles of the machine but that it made no difference whether he used a mock-up or an actual projector or whether the equipment was demonstrated.

A total of 1900 aircraft maintenance technicians was used by Swanson and Aukes (1957) to teach fuel, hydraulic, and rudder control systems

by means of (a) operating mock-up, (b) nonoperating mock-up, (c) cut-away mock-up, (d) animated panels, (e) charts, and (f) symbolic diagrams. There was no significant difference among the devices when a lecture was given with them. However, when the lecture was omitted, significant differences were found in immediate recall (but not in delayed recall) for the hydraulic and rudder control systems, but not for the fuel system.

L. Cohen (1959) had one member of each of 63 pairs of high-school seniors construct 22 models in studying solid geometry. Constructing models did not help in final achievement in the subject. Johnston (1956) used 106 college students of general electricity over a period of two years to determine the superiority of teacher demonstrations over shop activities.

Additional References: Ball (1959); Carlson (1959); Fell (1959); Knapp (1960); Lambert (1959); Owens (1956); Porter (1956); Redemsky (1959); Smith (1960); Twyford (1958, 1960); Villa (1960).

Learner Characteristics

More researchers have developed the suspicion that the characteristics of the viewer have more to do with the efficacy of teaching materials than the characteristics of the materials themselves or the manner of their use. A development during the past few years has been the increase in interest by psychologists in the interaction between learners and materials.

Maccoby, Wilson, and Burton (1958) studied the eye movements of subjects of both sexes watching motion pictures to determine whether each sex tends to watch a character of the same sex. The subjects were 48 college students, equally divided by sex, who were shown two 3-reel feature films containing test scenes in which one character of each sex was on the screen. Eye movements were timed by an observer, not recorded on an eye camera. Surprisingly, men did tend to watch male characters on the screen significantly more than women subjects did. Data for women characters were not given. The authors called attention to the many variables in the film which could emphasize sex character differences. In a related investigation, Maccoby and Wilson (1957) performed an identification study on 25 classes of grade 7 pupils who were shown two 20-minute episodes of a movie serial featuring an upper-middle-class boy, and a lower-class boy. Identification was inferred from the subjects' preference between these two characters. It turned out that the boys tended to identify with the class to which they aspired rather than with the class to which they belonged. They remembered more of the content of the film related to their identification. After showing another film in which the two primary characters were a boy and a girl, the authors found that boys remembered more aggressive content from the film than girls, but girls remembered more "girl alone" content; results from later recall were approximately the same. The authors made many more detailed analyses. If the basic assumption of identification is accepted, the results would provide many clues for further experimentation.

Krebs (1958) used only two films with an experimental group to determine whether showing of the films would be associated with a more homogeneous perception of the specific learning situation than that found for the nonfilm control group. His hypothesis was confirmed, although he stated that similar changes in larger groups would be more difficult to determine. To find out whether the viewer's learning from the film depends on his perception of its usefulness to him, Greenhill and McNiven (1956) showed three films to 473 high-school seniors and then had them respond to a scale of perceived usefulness drawn up by the authors. On this basis, they concluded that the more an individual perceives himself using the content of the film, the more he will learn from it. In another quantitatively oriented study, Merrill and McAshan (1960) developed a prediction system for the learning of facts and skills from a film and for the determination of attitude changes with which its showing could be associated.

Denny (1958) used a series of unspecified films to reduce the frustration level of 249 grade 8 pupils, as compared to a control group. In terms of the measures furnished by the *California Test of Personality, Intermediate Series, Form A*, significant gains in adjustment were made in the area of personal adjustment (but not social adjustment), primarily by girls rather than boys and by those pupils scoring high in intellectual measures. Using a smaller group of nine adolescent boys, Iscoe, Mims, and White (1957), in a similar manner, employed 12 films and concluded subjectively that motion pictures offer a promising means of getting at the underlying maladjustments of emotionally disturbed children.

Using small groups of 10 experimental and 10 control nursery-school children, Lövaas (1961) exposed them to five-minute aggressive and non-aggressive films and then allowed them to play with either aggressive or nonaggressive toys. As expected, exposure to aggressive films was associated with a tendency to play with aggressive toys, and experience with nonaggressive films was related to the amount of play with nonaggressive toys. Working with adult psychiatric patients, Whitmyre (1959) observed, in general, no difference in overt behavior during the showing of various types of feature films. However, patients having greater contact with reality showed more emotionally disturbed reactions to films than the more seriously ill patients.

In the complex business of fitting teaching materials and methods to learners, it is to be hoped that more researchers will take an interest in the field of learner characteristics and their relation to specific teaching materials.

Additional References: Fritz (1957); Horowitz and Fromer (1960).

Utilization

A number of the experiments reported above could also be listed here as a test of ways in which the materials were used, but for the sake of

brevity they will not be repeated under this category. The two to be reviewed, therefore, are primarily concerned with the manner in which the materials are used in teaching. Staudohar and Smith (1956) used a feature film on discipline with 850 trainee airmen divided into groups given (a) a lecture before the film, (b) a lecture after the film, (c) a lecture before and after the film, and (d) no lecture. The criterion test was an attitude scale of 16 items developed with a sample of 311 trainees. There were no significant differences among the four methods. Carter, Moss, and Wilson (1961) worked with 104 educable mentally retarded children, showing them seven short films on health and safety in these three versions: (a) narration, (b) no narration, but with synchronized voices of children, and (c) no sound, but with encouragement from the interviewer for the children to make loud, unrestrained, and frequent comments on the film. A control group did not see the films. No significant differences resulted.

From a consideration of the several studies reviewed it may be concluded that research activities are progressing at a rapid pace. It is also apparent that much of the research is highly specialized, even though the substantive aspects cut across many fields of endeavor in the behavioral sciences.

Additional References: Adkins (1961); Roper (1956); Salley (1957); Siegel (1956).

Bibliography

- ALLEN, WILLIAM H. "Audio-Visual Materials." *Review of Educational Research* 26: 125-56; April 1956.
- ANDERSON, KENNETH E., and MONTGOMERY, FRED S. "An Evaluation of the Introductory Physics Course on Film." *Science Education* 43: 386-94; December 1959.
- ANDERSON, KENNETH E.; MONTGOMERY, FRED S.; and MOORE, SID F. "An Evaluation of the Introductory Chemistry Course on Film." *Science Education* 45: 254-69; April 1961.
- BEVAN, WILLIAM; SECORD, PAUL F.; and RICHARDS, JAMES M. "Personalities in Faces: V. Personal Identification and the Judgment of Facial Characteristics." *Journal of Social Psychology* 44: 289-91; 1956.
- BLOOMER, RICHARD H. "Children's Preferences and Responses as Related to Styles and Themes of Illustration." *Elementary School Journal* 60: 334-40; March 1960.
- BOYD, NANCY A., and MANDLER, GEORGE. "Children's Responses to Human and Animal Stories and Pictures." *Journal of Consulting Psychology* 19: 367-71; October 1955.
- BUTTS, GORDON K. *An Experimental Study of the Effectiveness of Declarative, Interrogative, and Imperative Captions on Still Pictures*. Doctor's thesis. Bloomington: Indiana University, 1956. 155 p. Abstract: *Dissertation Abstracts* 16: 2400-2401; No. 12, 1956.
- BYROM, JOHN M. *The Development of a Scale of Photographs for the Appraisal of Learning Influences in Industrial Arts Shops*. Doctor's thesis. University Park: Pennsylvania State University, 1957. 173 p. Abstract: *Dissertation Abstracts* 18: 116-17; No. 1, 1958.
- CARTER, LAMORE J.; MOSS, ROY B.; and WILSON, MAMIE T. "A Comparative Study of the Effectiveness of Three Techniques of Film Utilization in Teaching a Selected Group of Educable Mentally Retarded Children Enrolled in Public Schools in Louisiana." (Abstract) *AV Communication Review* 9: A16-A17; July-August 1961.

- CASPERS, WESLEY. *An Experimental Evaluation of Certain Motion Picture Films in Selected Educational Psychology Classes in Kansas Colleges*. Doctor's thesis. Minneapolis: University of Minnesota, 1956. 239 p. Abstract: *Dissertation Abstracts* 16: 1105-1106; No. 6, 1956.
- CHAMBERS, JAY L. "Identification with Photographs of People." *Journal of Consulting Psychology* 21: 232-34; June 1957.
- CHANCE, CLAYTON W. "Experimentation in the Adaptation of the Overhead Projector Utilizing 200 Transparencies and 800 Overlays in Teaching Engineering Descriptive Geometry Curricula." (Abstract) *AV Communication Review* 9: A17-A18; July-August 1961.
- COHEN, LOUIS. *An Evaluation of a Technique To Improve Space Perception Abilities Through the Construction of Models by Students in a Course in Solid Geometry*. Doctor's thesis. New York: Yeshiva University, 1959. 108 p. Abstract: *Dissertation Abstracts* 21: 1136; No. 5, 1960.
- COHEN, SAMUEL. "Classroom Experiment Shows 'Saturation' AV Gets Results." *Educational Screen and Audiovisual Guide* 39: 324-29; July 1960.
- COTTLE, EUGENE. *An Experiment Using World History Films with Selected Tenth Grade Pupils: Implications for the Improvement of Teaching with Motion Picture Films*. Doctor's thesis. Carbondale: Southern Illinois University, 1960. 138 p.
- DENNY, EARL W. *A Study of the Effectiveness of Selected Motion Pictures for Reducing Frustration in Children*. Doctor's thesis. Seattle: University of Washington, 1958. 111 p. Abstract: *Dissertation Abstracts* 19: 3170-71; No. 12, 1959.
- DRURY, FRANCIS A. *An Evaluation of Visual Aids in the Teaching of Tumbling*. Doctor's thesis. Iowa City: State University of Iowa, 1959. 102 p. Abstract: *Dissertation Abstracts* 20: 949-50; No. 3, 1959.
- DUVAL, D. P., and OTHERS. "The Effectiveness, Acceptability, and Feasibility of Technical Training Courses Recorded on Sound Motion Pictures and Slides plus Tape." (Abstract) *AV Communication Review* 8: 312; November-December 1960.
- DWORKIN, SOLOMON, and HOLDEN, ALAN. "An Experimental Evaluation of Sound Filmstrips vs. Classroom Lectures." (Abstract) *AV Communication Review* 8: 157; May-June 1960.
- EDGERTON, HAROLD A. "The Acceptability and Effectiveness of the Casual Use of Auditory Training Aids." (Abstract) *AV Communication Review* 9: 77; January-February 1961.
- ERICKSON, LAWRENCE W., and CHOW, CLETUS. "The Manual Portable Typewriter as a Tool of Learning with Fifth Grade Elementary School Pupils." (Abstract) *AV Communication Review* 9: 232; July-August 1961.
- FARMER, RONALD J. *The Effect of Selected Film Sequences on Individuals Toward Nature and Art Forms*. Doctor's thesis. University Park: Pennsylvania State University, 1958. 141 p. Abstract: *Dissertation Abstracts* 19: 1615-16; No. 7, 1959.
- FERGUSON, MARIAN NELSON. "A Comparison of the Chain Associations of Nursery School and Kindergarten Children to Action-Picture Stimuli." *Audio-Visual Communication Review* 7: 310-11; Fall 1959.
- GIBSON, MRS. R. E. "Final Report on the Westside High School Teaching by Tape Project." *Bulletin of the National Association of Secondary-School Principals* 44: 56-62; January 1960.
- GIDEON, SARA B. *Aural Comprehension or Auding in Secondary School German*. Doctor's thesis. University Park: Pennsylvania State University, 1956. 158 p. Abstract: *Dissertation Abstracts* 17: 274-75; No. 2, 1957.
- GLAZENER, EVERETT RUTHVEN. *An Experimental Determination of the Value of Selected Visual Aids in Teaching Beginning Mechanical Drawing*. Doctor's thesis. University Park: Pennsylvania State University, 1958. 128 p. Abstract: *Dissertation Abstracts* 19: 2878-79; No. 11, 1959.
- GOEHRING, HARVEY J., JR. *Construction and Validation of a Film Slide Test To Measure Ability To Apply Scientific Method in a Selected Area of High School Physics*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 243 p. Abstract: *Dissertation Abstracts* 17: 110-11; No. 1, 1957.
- GREENHILL, LESLIE P. "Application of Sound Motion Pictures to Research in Clinical Psychology." *Audio-Visual Communication Review* 5: 529-38; Fall 1957.
- GREENHILL, LESLIE, and MCNIVEN, MALCOLM. "Relationship Between Learning and the Perceived Usefulness of a Film." *Audio-Visual Communication Review* 4: 255-67; Fall 1956.

- HEPLER, EARL R. *Order of Presenting Orthographic Projection and Pictorial Representation and Its Effect on Achievement in Engineering Drawing*. Doctor's thesis. Columbia: University of Missouri, 1957. 232 p. Abstract: *Dissertation Abstracts* 17: 2222-23; No. 10, 1957.
- HIRSCH, RICHARD S. "Experiments in Rifle Marksmanship Training—Film Experiment." (Abstract) *Audio-Visual Communication Review* 5: 552; Fall 1957.
- ISCOE, IRA; MIMS, JEAN; and WHITE, PAUL. "An Exploration in the Use of Personal Adjustment Motion Pictures as a Psychotherapeutic Medium." (Abstract) *Audio-Visual Communication Review* 5: 550-51; Fall 1957.
- JOHNSTON, JOHN L. *Teacher-Demonstration Versus Shop Activities in the Teaching of Electricity: An Experimental Comparison*. Doctor's thesis. Columbia: University of Missouri, 1956. 210 p. Abstract: *Dissertation Abstracts* 16: 2105; No. 9, 1956.
- JOHNSTON, ROLAND E., JR. *Magnetic Recordings and Visual Displays as Aids in Teaching Introductory Psychology to College Students*. Philadelphia: Drexel Institute of Technology, May 1961. 62 p.
- KREBS, ROBERT E. *The Effects of Educational Films on Student Perceptions*. Doctor's thesis. Gainesville: University of Florida, 1958. 136 p. Abstract: *Dissertation Abstracts* 19: 1030; No. 5, 1958.
- LÖVAAS, O. IVAR. "Effect of Exposure to Symbolic Aggression on Aggressive Behavior." *Child Development* 32: 37-44; March 1961.
- LUBIN, NATHAN M., and WILSON, M. O. "Picture Test Identification as a Function of 'Reality' (Color) and Similarity of Picture to Subject." *Journal of General Psychology* 54: 31-38; January 1956.
- MCBEATH, RONALD J. "A Comparative Study of the Effectiveness of the Filmstrip, Sound Filmstrip, and Filmograph for Teaching Facts and Concepts." (Abstract) *AV Communication Review* 9: A24-A25; July-August 1961.
- MACCOBY, ELEANOR E., and WILSON, WILLIAM C. "Identification and Observational Learning from Films." *Journal of Abnormal and Social Psychology* 55: 76-87; July 1957.
- MACCOBY, ELEANOR E.; WILSON, WILLIAM C.; and BURTON, ROGER V. "Differential Movie-Viewing Behavior of Male and Female Viewers." (Abstract) *Audio-Visual Communication Review* 6: 307-308; Fall 1958.
- MAY, MARK A., and LUMSDAINE, ARTHUR A. "Attention Directed to Parts of a Film." *Learning from Films*. New Haven, Conn.: Yale University Press, 1958. Chapter 7, p. 84-106.
- MERRILL, IRVING R., and MCASHAN, HILDRETH H. "Predicting Learning, Attitude Shift, and Skill Improvement from a Traffic Safety Film." *AV Communication Review* 8: 263-74; November-December 1960.
- MOLDSTAD, JOHN. "Doctoral Dissertations in Audio-Visual Education: Supplement III." (Abstract) *AV Communication Review* 9: 220-29; July-August 1961.
- NEWMAN, SLATER E., and HIGHLAND, RICHARD W. "The Effectiveness of Four Instructional Methods at Different Stages of a Course." (Abstract) *Audio-Visual Communication Review* 5: 562; Fall 1957.
- NOALL, MATTHEW F., and WINGET, LERUE. "Staff Utilization Studies Help with Education: B. The Physics Film Project." *Bulletin of the National Association of Secondary-School Principals* 43: 183-95; January 1959.
- NORBERG, KENNETH D. "The First of the Title VII Reports—A Review." (Abstract) *AV Communication Review* 9: A5-A14; July-August 1961.
- POPHAM, W. JAMES. "Tape Recorded Lectures in the College Classroom." *AV Communication Review* 9: 109-18; March-April 1961.
- POPHAM, W. JAMES, and SADNAVITCH, JOSEPH M. "The Effectiveness of Filmed Science Courses in Public Secondary Schools." (Abstract) *AV Communication Review* 9: A28-A29; July-August 1961.
- REDDILL, WILLIAM D., and DEVAULT, M. VERE. "In-Service Research in Arithmetic Teaching Aids." *Arithmetic Teacher* 7: 243-46; May 1960.
- RICHTER, MARION. *Drawing and Learning in Biology: The Relationship Between Pupils' Drawings of Visual Aids and Their Learning in Biology*. Doctor's thesis. New York: Columbia University, 1956. 118 p. Abstract: *Dissertation Abstracts* 16: 2090-91; No. 9, 1956.
- RYAN, T. A., and SCHWARTZ, CARYL B. "Speed of Perception as a Function of Mode of Representation." *American Journal of Psychology* 69: 60-69; March 1956.
- SADNAVITCH, JOSEPH M., and POPHAM, W. JAMES. "Measuring Attitudes Toward Filmed Courses." *AV Communication Review* 8: 286-88; November-December 1960.

- SAUL, EZRA V., and OTHERS. "A Review of the Literature Pertinent to the Design and Use of Effective Training Aids." (Abstract) *Audio-Visual Communication Review* 5: 565-66; Fall 1957.
- SCHENBERG, SAMUEL. "An Experiment in the Use of Films for the Inservice Training of High School Chemistry Teachers, October 6, 1959 to February 6, 1960." (Abstract) *AV Communication Review* 9: 76; January-February 1961.
- SILVERMAN, R. E. "The Comparative Effectiveness of Animated and Static Transparencies." (Abstract) *Audio-Visual Communication Review* 6: 238-39; Summer 1958.
- SMITH, HERBERT A., and ANDERSON, KENNETH E. "An Inquiry into Some Possible Learning Differentials as a Result of the Use of Sound Motion Pictures in High School Biology." *Science Education* 42: 34-37; February 1958.
- SPECIAL DEVICES CENTER. *Bibliography of Human Engineering Reports*. (Unclassified) NAVEXOS P-1491. Port Washington, N.Y.: Special Devices Center, Office of Naval Research, 1956. 18 p.
- SPRAGUE, NEWTON G. *A Comparative Study of the Effectiveness of Filmstrips and Flat Pictorial Material*. Doctor's thesis. Bloomington: Indiana University, 1955. 156 p. Abstract: *Dissertation Abstracts* 17: 312-13; No. 2, 1957.
- STAUDOHAR, FRANK T., and SMITH, ROBERT G., JR. "The Contribution of Lecture Supplements to Effectiveness of an Attitudinal Film." *Journal of Applied Psychology* 40: 109-11; April 1956.
- STEIN, SARAH C. *An Experimental Study of the Use of Motion Picture Film Loops in the Instruction of Beginning Typewriting*. Doctor's thesis. Los Angeles: University of Southern California, 1958. 252 p. Abstract: *Dissertation Abstracts* 19: 3253-54; No. 12, 1959.
- SWANSON, ROBERT A., and AUKES, LEWIS E. "Evaluation of Training Devices for B-47 Fuel, Hydraulic and Rudder Power Control Systems." (Abstract) *Audio-Visual Communication Review* 5: 563; Fall 1957.
- TANNENBAUM, PERCY H., and FOSDICK, JAMES A. "The Effect of Lighting Angle on the Judgment of Photographed Subjects." *AV Communication Review* 8: 253-62; November-December 1960.
- TRUBOV, HERMAN. *An Experimental Study of the Effectiveness of a Mock-Up of the 16 Millimeter Motion-Picture Projector for Teaching the Threading of the Projector for Maximum Transfer*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1956. 159 p. Abstract: *Dissertation Abstracts* 16: 1861; No. 9, 1956.
- VANDERMEER, A. W. "Ten Recent Title VII Reports: A Perspective." (Abstract) *AV Communication Review* 9: A35-A44; November-December 1961.
- VERNON, M. D. "The Use and Value of Graphical Material with a Written Text." (Abstract) *Audio-Visual Communication Review* 5: 565; Fall 1957. (a)
- VERNON, M. D. "The Use and Value of Graphical Methods of Presenting Quantitative Data." (Abstract) *Audio-Visual Communication Review* 5: 566; Fall 1957. (b)
- VERNON, M. D. "The Value of Pictorial Illustration." (Abstract) *Audio-Visual Communication Review* 5: 564-65; Fall 1957. (c)
- VERNON, M. D. "The Visual Presentation of Factual Data." (Abstract) *Audio-Visual Communication Review* 5: 564; Fall 1957. (d)
- WEINTRAUB, SAM. *The Effect of Pictures on the Comprehension of a Second Grade Basal Reader*. Doctor's thesis. Urbana: University of Illinois, 1960. 92 p. Abstract: *Dissertation Abstracts* 21: 1428-29; No. 6, 1960.
- WENDT, PAUL R., and BUTTS, GORDON K. *A Report of an Experiment in the Acceleration of Teaching Tenth Grade World History with the Help of an Integrated Series of Films*. Carbondale: General Publications, Southern Illinois University, 1960. 9 p.
- WHITMYRE, JOHN W. "Psychiatric Patients' Audience Reactions to Types of Motion Pictures." (Abstract) *Audio-Visual Communication Review* 7: 237-38; Summer 1959.
- WITTICH, W. A.; PELLA, MILTON O.; and WEDEMEYER, C. A. "The Wisconsin Physics Film Evaluation Project." (Abstract) *AV Communication Review* 8: 156; May-June 1960.
- WITTY, PAUL, and FITZWATER, JAMES P. "An Experiment with Films, Film-Readers, and the Magnetic Sound Track Projector." (Abstract) *Audio-Visual Communication Review* 5: 554-55; Fall 1957.
- YOCK, DONALD, and ERLANDSON, FORREST. "The Effectiveness of Visual Aids in Dental Teaching." *Journal of Educational Research* 52: 11-15; September 1958.

Additional References

- ADKINS, GALE R. "A Study of Certain Factors That Influence the Use of Radio Broadcasts and Recordings in Public School Classrooms." (Abstract) *AV Communication Review* 9: 158; March-April 1961.
- BALL, CHARLES E. *Filmed Demonstrations for Individual Arts: Sound Motion Pictures of Selected Industrial Arts Demonstrations Which May Be Used as a Teaching Device*. Doctor's thesis. New York: New York University, 1959. 138 p. Abstract: *Dissertation Abstracts* 20: 1283; No. 4, 1959.
- CARLSON, FREDERIC R. *The Design, Production, and Evaluation of a Vocational Guidance Film on Occupations for the Quincy School System*. Doctor's thesis. Boston: Boston University School of Education, 1959. 130 p. Abstract: *Dissertation Abstracts* 21: 2529; No. 9, 1961.
- FELL, JOHN L. *A Comparison Between Sponsored and Educational Motion Pictures: A Study of High School Biology Films Issued in the United States in 1955*. Doctor's thesis. New York: New York University, 1959. 123 p. Abstract: *Dissertation Abstracts* 20: 223; No. 1, 1959.
- FRITZ, JOHN O. *Film Persuasion in Education and Social Controversies: A Theoretical Analysis of the Components Manifest in Viewer-Film Involvement as They Affect the Viewer's Urge To Further Inquiry into Social Controversies*. Doctor's thesis. Bloomington: Indiana University, 1957. 426 p. Abstract: *Dissertation Abstracts* 17: 2221; No. 10, 1957.
- HOROWITZ, MILTON W., and FROMER, ROBERT. "A Set of Discriminable Surface Colors and Symbols for Coding in Animated Training Panels." (Abstract) *AV Communication Review* 8: 79; Winter 1960.
- KNAPP, AUSTIN C. *An Analysis of Trends in Selected Graduate Audiovisual Education Programs*. Doctor's thesis. Bloomington: Indiana University, 1960. 146 p. Abstract: *Dissertation Abstracts* 21: 2631; No. 9, 1961.
- LAMBERT, CHARLOTTE L. *A Film for Teaching Selected Sport Skills to Elementary School Children*. Doctor's thesis. Iowa City: State University of Iowa, 1959. 144 p. Abstract: *Dissertation Abstracts* 20: 2137-38; No. 6, 1959.
- OWENS, BLANCHE ELIZABETH. *A Film on Fundamental Procedures in Physical Education for Elementary School Classroom Teachers*. Doctor's thesis. Iowa City: State University of Iowa, 1956. 128 p. Abstract: *Dissertation Abstracts* 16: 1633; No. 9, 1956.
- PORTER, LORENA R. *Construction of a Film as an Aid for Teachers of Primary Physical Education*. Doctor's thesis. Iowa City: State University of Iowa, 1956. 74 p. Abstract: *Dissertation Abstracts* 16: 1633-34; No. 9, 1956.
- REDEMSKY, LOUIS W. "Student Evaluation of Films Used in College Social Studies." *Audio-Visual Communication Review* 7: 3-13; Winter 1959.
- ROPER, KEITH I. *The Utilization of Industry-Sponsored Instructional Materials by Colorado High School Chemistry Teachers*. Doctor's thesis. Boulder: University of Colorado, 1956. 211 p. Abstract: *Dissertation Abstracts* 17: 2884-85; No. 12, 1957.
- SALLEY, HOMER E. *A Study of the Use of 16mm Films by Community Organizations with Special Attention to the Louisville Free Public Library as a Source of Films for Such Groups in Louisville, Kentucky*. Doctor's thesis. Bloomington: Indiana University, 1957. 227 p. Abstract: *Dissertation Abstracts* 17: 2201-02; No. 10, 1957.
- SIEGEL, HELENE F. *A Study of Teachers' Use of Business-Sponsored Instructional Materials in Selected Elementary Schools*. Doctor's thesis. Detroit: Wayne University, 1956. 118 p. Abstract: *Dissertation Abstracts* 16: 1643; No. 9, 1956.
- SMITH, KARL U. "The Scientific Principles of Textbook Design and Illustration." *AV Communication Review* 8: 27-49; Winter 1960.
- TWYFORD, LORAN C. "Michigan Educational Film Libraries." (Abstract) *Audio-Visual Communication Review* 6: 231; Summer 1958.
- TWYFORD, LORAN C. "Operations Research on Instructional Films." (Abstract) *AV Communication Review* 8: 156; May-June 1960.
- VILLA, ALFRED L. *Educational Factors That Influence Decisions To Produce Instructional Films*. Doctor's thesis. Boston: Boston University School of Education, 1960. 204 p. Abstract: *Dissertation Abstracts* 21: 2640-41; No. 9, 1961.

CHAPTER IV

Learning from Instructional Television

WILBUR SCHRAMM

THERE CAN no longer be any doubt that students learn efficiently from instructional television. The fact has been demonstrated now in hundreds of schools, by thousands of students, in every part of the United States and in several other countries. Schools and colleges have been able to teach virtually every subject effectively by television. The conclusion is that the average student is likely to learn about as much from a TV class as from ordinary classroom methods; in some cases he will learn more and in some less, but the over-all verdict has been, "no significant difference." Pertinent to this conclusion is the evidence presented in two reviews by Kumata (1956, 1960), in the paper by Carpenter (1960), and in the summary of research by Finn (1953).

Now that approximately 400 quantitative studies exist in which comparisons of instructional television and classroom teaching have been made, it is time to review that verdict. Do the early conclusions stand up under this massive testing? Under what conditions, for what students, and in what areas of subject matter does instructional television teach best, and in which ones least well? What do teachers and students think of classes by television? What does instructional television do to morale and to motivation?

Much of the research on instructional television is not in the journals: it exists in the form of mimeographed reports. The Ford Foundation, the Fund for the Advancement of Education, the U.S. Office of Education, and a number of school officials and researchers have made their collections of these reports available to this writer. As a result, it has been possible to assemble 425 cases with apparently adequate design, controls, and statistical treatment—393 in which instructional television has been compared with other classroom teaching and 32 in which home instruction by television has been compared with classroom teaching. Although these experiments are not the only ones that have been made, they are the only ones available for consideration. Nevertheless, these investigations represent a much larger sampling of results than has ever been assembled previously, and on the basis of them one can speak with somewhat more confidence than before about instructional television.

Learning from Television

Table 1 summarizes the results of the 393 comparisons of instructional television with classroom teaching in schools and colleges.

TABLE 1. Summary of 393 Research Studies Comparing the Relative Effectiveness of Conventional Classroom Teaching and Instructional Television*

School Level	Direction of Findings	Number of cases in—						
		Mathematics	Science	Social Studies	Humanities, History, Arts, Literature	Language Skills	Health, Safety	Total
1	2	3	4	5	6	7	8	9
Grades 3-6	+TV...	14	8	12	0	14	2	50
	n.s.....	21	14	11	0	36	4	86
	-TV...	3	1	1	0	10	1	16
Grades 7-9	+TV...	4	9	0	2	0	3	18
	n.s.....	11	8	1	7	0	1	28
	-TV...	2	3	0	0	0	0	5
Grades 10-12	+TV...	0	3	3	4	1	1	12
	n.s.....	10	7	17	17	6	0	57
	-TV...	5	3	0	9	4	0	21
College	+TV...	0	1	1	0	0	1	3
	n.s.....	4	26	24	11	12	7	84
	-TV...	0	1	4	3	1	4	13
Total	+TV...	18	21	16	6	15	7	83
	n.s.....	46	55	53	35	54	12	255
	-TV...	10	8	5	12	15	5	55

The symbol "+TV" means that television was significantly superior, at the .05 level or beyond, to ordinary classroom teaching; the notation "n.s." means not significant—no difference between television and face-to-face teaching significant at the .05 level; and the symbol "-TV" means that television was significantly inferior to ordinary classroom teaching, at or beyond the .05 level.

* Grades 3-6 different from grades 10-12 ($p < .001$). Grades 7-9 different from 10-12 ($p < .01$). Grades 3-9 different from grade 10—college ($p < .001$). Both grades 3-9 and grades 7-9 different from college ($p < .001$). Science different from humanities ($p < .01$). Social studies different from humanities ($p < .05$).

The entries of Table 1 indicate that early conclusions are supported: instructional television has been at least as effective as ordinary classroom instruction, when evaluative instruments have been employed. Use of standardized tests begs the question of whether the intangibles of TV teaching are as beneficial as those of ordinary classroom teaching, a question which will be considered before the end of this chapter. However, when the usual tests of achievement used by schools to measure student progress are employed, it may be said with considerable confidence that in 65 percent of a very large number of comparisons between televised and classroom teaching there is no significant difference. In 21 percent of the comparisons, students learned significantly more from television; in 14 percent, they learned significantly less.

It is clear that televised instruction has been used with greater success in grades 3-9 than in high school or college. This can be illustrated by figures derived from Table 1, shown in Table 2.

TABLE 2. Comparison of Relative Effectiveness of Conventional Classroom Teaching and Instructional Television by School Level

School Level	Relative Effectiveness			Number of Studies
	Percentage of Greater TV Effectiveness	Percentage in Which No Significant Difference Exists	Percentage of Lower TV Effectiveness	
1	2	3	4	5
Grades 3-9.....	33%	56%	11%	203
High School.....	13	63	24	90
College.....	3	84	13	100

The results for grades 3-9 are significantly different from those for high school and for college, as are also the differences for grades 3-6 and grades 7-9 taken separately.

Turning again to Table 1, it is apparent that in some subject-matter areas, TV teaching has been more effective than in others. Mathematics and science, for example, have been outstandingly successful, as has social studies. History, the humanities, and literature have been less successful. Language skills and health and safety have been in the middle range—neither so successful as the most effective subjects nor so ineffective as the humanities group. Although many of these numbers are too small to show up on tests of significance, both science and social studies are still significantly different from the humanities group. Other differences must be considered mere indications of trends.

In several cases, there appear to be interactions of importance between subject matter and grade level. Televised language skills have been found

to be somewhat less effective than have other televised subjects at the early elementary-school level, although still, on an over-all basis, as effective as classroom teaching. Mathematics has been more effectively taught by television in the early grades than in high school. Televised social studies has been somewhat less effective in college than in the lower grades, and the humanities group also appears to have been taught less effectively on television at the higher-grade levels.

Because of the Chicago City Junior College study (Erickson and Chausow, 1960) and the San Francisco State College study (Dreher and Beatty, 1958), some comparisons may be made between TV instruction for students at home and ordinary classroom teaching. Thirty-two such comparisons now available, all on the college level, may be tabulated as shown in Table 3.

TABLE 3. Comparison of Effectiveness of Conventional Classroom Teaching and Home Instructional Television for College Students by Subject-Matter Area

Subject-Matter Area	Numbers of comparisons in which—			Number of Studies Involved
	TV is more effective	No significant difference exists	TV is less effective	
1	2	3	4	5
Mathematics.....	1	2	0	3
Science.....	4	4	1	9
Social Studies.....	2	8	0	10
Humanities.....	1	1	0	2
Language Skills.....	2	6	0	8
Total.....	10	21	1	32

It must be remembered that these home students are, in large part, adults who have been unable to finish their college education because they are housebound. They are consequently highly motivated and grateful for their opportunity to study by television. When the home-TV students are compared with students taught by television in the classroom, they have almost always done better. However, the unusually high motivation of the home-TV students and the rather negative attitudes of the classroom-TV students (who were assigned to an experimental section and deprived of the personal contact which other resident students had with the instructor) lead to a discounting of these latter comparisons. Therefore, they are not recorded here.

Additional References: Anderson and VanderMeer (1954); Benschoter and Charles (1957); Brandon (1956); Englehart, Schwachtgen, and Nee (1957); Kumata (1960a); Mullin (1957); Schramm (1960).

Student Attitudes Toward Instructional Television

Typically, students in elementary school think that they learn more from TV classes, whereas high-school and college students are more doubtful. When students in various school systems [*North Carolina In-School Television Experiment, 1958-59* (1959); Cincinnati Public Schools (1959); and Kansas City, Missouri, Public Schools (1960)] were asked, "Do you think students learn more, the same, or less from a TV class?" they answered as shown in Table 4.

TABLE 4. Comparison of Student Evaluations of Relative Effectiveness of Conventional Classroom Teaching and Instructional Television by School Level

School Level	Percentage of students who reported they learned—			Number of Subjects
	More from TV class	About the same from TV class	Less from TV class	
1	2	3	4	5
North Carolina Elementary.....	77%	13%	10%	533
Cincinnati High School.....	30	37	33	277
Kansas City High School.....	57	31	12	300

This question was not often asked in the same way in college experiments, and, therefore, the results cannot be compared exactly. However, the general attitudes of college students toward instructional television are, if anything, less favorable than those of high-school students. Students of psychology and chemistry at Pennsylvania State University (Carpenter and Greenhill, 1958) rated the amount of learning about the same for TV and classroom instruction, but students in the non-TV class rated psychology as a subject somewhat higher than did TV students. At Miami University, only 2 attitude comparisons in 10 were favorable to television (Macomber and Siegel, 1960), and only 1 of those was significant; whereas 3 comparisons were significant in the direction of classroom teaching. Out of the 10 responses, 7 became less favorable to television as the course progressed. In a Purdue University calculus class, the attitude toward instructional television became worse as the course went on (Dyer-Bennet and others, 1958). San Francisco State College (Dreher and Beatty, 1958) and the Chicago City Junior College (Erickson and Chausow, 1960) both found that the students they assigned to classroom television were more negative toward the course than were ordinary classroom students and more negative toward teaching by television than were students who viewed the class at home.

There is a great deal of material on the morale and attitudes of TV students which cannot be referred to here, except to mention that, in general, elementary-school children are enthusiastic over TV classes; high-school students are much less so; and college students are equivocal or even, in some cases, unfavorable. If attitudes of home-TV students are added to the picture, a U-shaped distribution is obtained, with equally favorable attitudes of elementary-school children at one end and adult home students at the other; the attitudes of high-school and college students fall in the lower parts of the U.

One should not conclude, however, that there is a simple relationship between age or grade level and attitude. Rather, there is considerable evidence that attitudes tend to be specific to subjects and to teachers.

For example, in Jefferson County, Kentucky, nearly 100 percent of the children preferred the TV science class to the regular class, but less than 50 percent preferred the TV social studies class (Jefferson County Schools, 1960). Norfolk students reported that they liked televised science more, and televised geometry less, than regular classes (Norfolk City Schools, 1958, 1960a, b).

Attitudes of college students toward instructional television are also specific to subject matter. Students in five Oregon colleges and universities (Starlin and Lollas, 1960) felt that their TV chemistry course was, in general, better than classroom teaching in stimulating their learning and that a course in literature was about the same in that respect as classroom teaching, but that a course in English composition was, if anything, less effective than classroom teaching. Students in Chicago (Erickson and Chausow, 1960) expressed themselves as being more willing to take a TV course in physical science than in social science; however, they were more willing to take social science than humanities by television. At New York University (Klapper, 1958), students in two classes were asked during the first and second semesters whether they preferred the TV section or an ordinary lecture section. The responses are reported in Table 5.

TABLE 5. Comparison of College Student Preferences During First and Second Semesters of TV or Non-TV Sections by Subject-Matter Area

Subject-Matter Area	Percentage of students who preferred—	
	TV sections	Non-TV sections
1	2	3
English		
First Semester.....	31%	69%
Second Semester.....	20	80
Cultural Heritage		
First Semester.....	51	49
Second Semester.....	78	22

There is the suggestion that attitudes of college students may be described as being more favorable to TV classes in subjects where demonstrations are important (for example, natural science and art), but less favorable where student-teacher interaction and classroom discussion and drill are important (English composition and social studies).

Even the location of seats in a large classroom may directly relate to attitudes, as Carpenter and Greenhill (1958) found when they plotted the seat assignments of students who asked to be transferred out of a TV course. Moreover, in a number of colleges and high schools, surprising differences in attitudes have appeared in different sections of the same TV course; these differences appeared to relate only to the classroom teachers. Apparently, a large number of non-TV elements enter into the making of attitudes toward TV instruction.

The continuing measurements of student attitudes at Pennsylvania State University are especially interesting because the TV program there has now been under way for seven years. During the early years of that period, Carpenter and Greenhill (1955, 1958) and Greenhill, Carpenter, and Ray (1956) indicated that there was a gradual tendency toward a somewhat higher level of acceptance of instruction by television. Television per se ceases to be very important: it is merely another instrument, like a telephone or a slide projector. It is a standard way of teaching, and the important questions are who teaches, what is taught, and how it is taught. When the novelty wears off—as it has at Pennsylvania State—and if TV courses gain the reputation that they offer the best instruction a college can provide in a given subject, then there will be no question, the Pennsylvania State people believe, about TV acceptance by serious students.

Additional References: Becker and Dallinger (1960); Belson (1956); Bobren (1960); Evans (1956); Kumata (1960b).

Teacher Attitudes Toward Instructional Television

Most teachers who teach on television come to like it. Those who do not teach on television tend to be suspicious and resistant. This opposition usually is short-lived in the case of elementary-school teachers, most of whom come to like and depend on television as one part of their teaching resources. In Hagerstown, Maryland, where perhaps the most extensive experiment in closed-circuit instructional television has been conducted, teachers were asked whether they would prefer to teach the class they are now teaching with or without the aid of television; 83 percent said they preferred to do it with television (Hagerstown Board of Education, 1959). High-school teachers seem to be, on the average, a bit less favorable and more resistant than elementary-school teachers. In four systems—Milwaukee (Wisconsin) Public Schools (1960); Dade County Public Schools (1958, 1960) serving Miami, Florida; *North Carolina In-*

School Television Experiment, 1958-59 (1959); and Anaheim (California) School District (1960)—teachers and principals were asked whether they believed students learned more, the same, or less from TV instruction as compared with ordinary classroom instruction. The results are summarized in Table 6.

TABLE 6. Comparison of Teacher and Principal Evaluation of Relative Effectiveness of Conventional Classroom Teaching and Instructional Television

Location	Teachers				Principals			
	Percentage who believed students learned—			Number of Responses	Percentage who believed students learned—			Number of Responses
	More from TV classes	The same from TV classes	Less from TV classes		More from TV classes	The same from TV classes	Less from TV classes	
1	2	3	4	5	6	7	8	9
Milwaukee, Wisconsin...	40%	47%	13%	51	33%	53%	14%	9
Miami, Florida.....	45	48	7	82	...	...	...	...
North Carolina....	...	...	...	...	59	37	4	163
Anaheim, California...	54	37	9	93	87	13	0	101

The real center of teacher resistance to instructional television is in the colleges. Researchers studying the Oregon system of higher education (Starlin and Lollas, 1960) found "considerable resistance by individual professors." The dean of the College of Liberal Arts at the State University of Iowa reported, after a survey, that his faculty was unfavorable to any extensive use of television in teaching (Stuit, 1957). However, in terms of frequency of favorable as compared with unfavorable responses, studies both at Pennsylvania State University (Carpenter and Greenhill, 1955) and with the college system of Oregon (Starlin and Lollas, 1960) indicated that faculty attitudes could be judged as relatively more positive than negative.

Teachers discriminate sharply among TV courses. Asked to compare the progress their TV classes were making with the progress of previous

non-TV classes, a sample of Florida elementary-school teachers in Dade County (Dade County Public Schools, 1958, 1960) answered as shown in Table 7.

TABLE 7. Comparison of Dade County Public Elementary-School Teacher Evaluations of Relative Amount of Progress Made by Their Students with Conventional Classroom Teaching and Instructional Television by Subject-Matter Area

Subject-Matter Area	Percentage of teachers who reported that the progress of their students was—			Number of Teachers
	More from TV classes	The same from TV classes	Less from TV classes	
1	2	3	4	5
Science.....	67%	25%	8%	52
Music.....	23	52	25	48
Art.....	25	44	31	52
Physical Education.....	52	43	5	48
Spanish.....	26	53	21	47
Health & Safety.....	50	43	7	48

Asked which telecasts were most valuable to them, a large group of Anaheim, California, teachers and principals voted the science and social studies classes most helpful, the Spanish class only slightly less helpful, and the arithmetic telecast of comparatively little help (Anaheim School District, 1960). A sample of 1191 Milwaukee elementary teachers and principals (Milwaukee Public Schools, 1960) showed art, science, physical education, music, and social studies telecasts as most-wanted resources. The most-favored courses seem to be the ones that provide useful demonstrations (science) or in which the teacher needs special help (physical education, music, art); least favored are those courses built around classroom drill (reading, writing, spelling, arithmetic).

There is no comparable report of preferences of college teachers over a broad range of televised courses.

Summary

A striking fact has been presented here—the fact that about as much learning seems to take place in a TV class, as in an ordinary class. As Hoban (1958) suggests, there is every reason to expect less learning from television, because of the absence of give-and-take between teacher and student, of close attention to individual needs and differences, and of

other qualities which are believed to characterize classroom teaching. The following questions are suggested by the reported findings:

1. Are not teachers able to give much more preparation to their TV classes than to ordinary classes? Most schools release their TV teachers for a term or more before their actual TV teaching, despite the fact that most of these teachers have already taught the same subjects in classrooms for years. It would be interesting to see what would happen if teachers were permitted to put the same amount of additional effort and preparation into their classroom teaching.

2. Has not the point been neglected that TV teaching has built-in advantages as well as disadvantages? Does not television have an advantage over classroom teaching in being able to bring superior demonstrations into the classroom, share the best teachers, furnish a change of pace, and offer a sense of timeliness? Could one not, therefore, predict that (as the tables show) demonstration courses such as science would be more favorably received on television than courses that depend mainly on verbalization or on student practice?

3. Is it not reasonable to think that elementary-school students are more likely than older students to take the new method in stride? Elementary-school children have grown up with TV teaching. Their teachers feel less threatened by it and are more likely to be favorable to it, and the students are likely to reflect these attitudes. Television in the elementary school is more likely to be integrated into a lesson plan, with the classroom teacher as captain; but in college, and in some secondary-school courses, television is asked to carry all or nearly all the weight. For all practical purposes, an elementary-school experiment compares television *plus* some classroom teaching with classroom teaching alone; a college experiment is likely, however, to compare television alone with classroom teaching alone. It seems predictable, therefore, that TV teaching would achieve more favorable results in the elementary grades than in the upper-secondary and college years.

Viewed in this way, the tables in the early part of this chapter seem less astonishing than they otherwise might. They suggest (a) that under some conditions and used in some ways, instructional television can be highly effective and (b) that the pertinent question is no longer whether a teacher can teach effectively on television, but rather how, when, for what subjects, and with what articulation into classroom activities instructional television can most effectively be used.

Bibliography

- ANAHEIM SCHOOL DISTRICT. *Preliminary Report of ITV Project for School Year 1959-60*. Anaheim, Calif.: Board of Education, October 1960. 18 p. (Mimeo.)
- CARPENTER, C. R. "Approaches to Promising Areas of Research in the Field of Instructional Television." *New Teaching Aids for the American Classroom*. (Edited by Wilbur Schramm.) Stanford, Calif.: Institute for Communication Research, 1960. p. 73-94.

- CARPENTER, C. R., and GREENHILL, L. P. *An Investigation of Closed-Circuit Television for Teaching University Courses*. Instructional Television Research Project No. 1. University Park: Pennsylvania State University, 1955. 102 p.
- CARPENTER, C. R., and GREENHILL, L. P. *An Investigation of Closed-Circuit Television for Teaching University Courses*. Instructional Television Research Report No. 2. University Park: Pennsylvania State University, Spring 1958. 110 p.
- CINCINNATI PUBLIC SCHOOLS. *Report of Three Experiments in the Use of Television in Instruction*. Cincinnati, Ohio: Board of Education, 1959. 71 p. (Mimeo.)
- DADE COUNTY PUBLIC SCHOOLS. *Educational Television Experiment, 1957-1958*. Miami, Fla.: Dade County Board of Education, 1958. 53 p. (Mimeo.)
- DADE COUNTY PUBLIC SCHOOLS. *Educational Television Project Evaluation, 1959-1960*. Miami, Fla.: Dade County Board of Education, 1960. 22 p. (Mimeo.)
- DREHER, ROBERT E., and BEATTY, WALCOTT H. *An Experimental Study of College Instruction Using Broadcast Television*. Instructional Television Research: Project No. 1. San Francisco, Calif.: San Francisco State College, April 1958. 75 p.
- DYER-BENNET, JOHN, and OTHERS. "Teaching Calculus by Closed-Circuit Television." *American Mathematical Monthly* 65: 430-39; June-July 1958.
- ERICKSON, C. G., and CHAUSOW, H. M. *Chicago's TV College—Final Report of a Three-Year Experiment*. Chicago: Chicago City Junior College, 1960. 98 p. (Multilithed)
- FINN, JAMES D. "Television and Education: A Review of Research." *Audio-Visual Communication Review* 1: 106-26; Spring 1953.
- GREENHILL, L. P.; CARPENTER, C. R.; and RAY, W. S. "Further Studies of the Use of Television for University Teaching." *Audio-Visual Communication Review* 4: 200-15; Summer 1956.
- HAGERSTOWN BOARD OF EDUCATION. *Closed Circuit Television Teaching in Washington County, 1958-1959*. Hagerstown, Md.: the Board, 1959.
- HOBAN, CHARLES F. "Hope and Fulfillment in ETV Research." *Audio-Visual Communication Review* 6: 165-71; Summer 1958.
- JEFFERSON COUNTY SCHOOLS. *Project Report: Jefferson County Television Elementary Schools, 1957-1960*. Louisville, Ky.: Jefferson County Board of Education, 1960. 42 p. (Mimeo.)
- KANSAS CITY, MISSOURI, PUBLIC SCHOOLS. *Report of the Second Year: Educational Television Project in the Kansas City, Missouri, Public Schools (1959-1960)*. Kansas City, Mo.: Board of Education, 1960. 39 p. (Mimeo.)
- KLAPPER, HOPE L. *Closed Circuit Television as a Medium of Instruction at New York University, 1956-1957*. New York: New York University, 1958. 69 p.
- KUMATA, HIDEYA. *An Inventory of Instructional Television Research*. Ann Arbor, Mich.: Educational Television and Radio Center, December 1956. 155 p.
- KUMATA, HIDEYA. "A Decade of Teaching by Television." *The Impact of Educational Television*. (Edited by Wilbur Schramm.) Urbana: University of Illinois Press, 1960. p. 176-85.
- MACOMBER, F. G., and SIEGEL, LAURENCE. *Final Report of the Experimental Study in Instructional Procedures*. Oxford, Ohio: Miami University, 1960. 96 p.
- MILWAUKEE PUBLIC SCHOOLS. *The Milwaukee Experiment in Instructional Television: Evaluation Report (1957-1960)*. Milwaukee, Wis.: Board of Education, 1960. 112 p. (Offset)
- NORFOLK CITY SCHOOLS. *End of First Year National Educational Television Project*. Norfolk, Va.: Board of Education, 1958. 29 p. (Mimeo.)
- NORFOLK CITY SCHOOLS. *Educational Television Evaluation Report*. Norfolk, Va.: Board of Education, 1960. 23 p. (Mimeo.) (a)
- NORFOLK CITY SCHOOLS. *The Big Picture*. Norfolk, Va.: Board of Education, 1960. 50 p. (Mimeo.) (b)
- The North Carolina In-School Television Experiment, 1958-59*. Greensboro: University of North Carolina, 1959. 7 p. (Mimeo.)
- STARLIN, GLENN, and LOLLAS, JOHN E. *Inter-Institutional Teaching by Television in the Oregon State System of Higher Education*. Eugene: Oregon State System of Higher Education, 1960. 92 p.
- STUIT, DEWEY B. "Teaching on Closed-Circuit Television." *Journal of Higher Education* 28: 339-43, 352f; June 1957.

Additional References

- ANDERSON, GEORGE R., and VANDERMEER, ABRAM W. "A Comparative Study of the Effectiveness of Lessons on the Slide Rule Presented via Television and in Person." *Mathematics Teacher* 47: 323-27; May 1954.
- BECKER, SAMUEL L., and DALLINGER, CARL A. "The Effect of Instructional Methods upon Achievement and Attitudes in Communication Skills." *Speech Monographs* 27: 70-76; March 1960.
- BELSON, WILLIAM A. "Learning and Attitude Changes Resulting from Viewing a Television Series 'Bon Voyage.'" *British Journal of Educational Psychology* 26: 31-38; February 1956.
- BENSCHOTER, REBA PATTERSON, and CHARLES, DON C. "Retention of Classroom and Television Learning." *Journal of Applied Psychology* 41: 253-56; August 1957.
- BOBREN, HOWARD M. "Student Attitudes Toward Instructional Television: Additional Evidence." *AV Communication Review* 8: 281-83; November-December 1960.
- BRANDON, JAMES R. "The Relative Effectiveness of the Lecture, Interview and Discussion Methods of Presenting Factual Information by Television." (Abstract) *Speech Monographs* 23: 118; June 1956.
- ENGLEHART, MAX D.; SCHWACHTGEN, EDWARD C.; and NEE, MARY M. *Summary of Report on the Instruction Experiment in High School Physics in the Chicago Public Schools*. Chicago: Board of Education, 1957. 3 p. (Mimeo.)
- EVANS, RICHARD I. "An Examination of Students' Attitudes Toward Television as a Medium of Instruction in a Psychology Course." *Journal of Applied Psychology* 40: 32-34; February 1956.
- KUMATA, HIDEYA. "Two Studies in Classroom Teaching by Television." *The Impact of Educational Television*. (Edited by Wilbur Schramm.) Urbana: University of Illinois Press, 1960. p. 151-57 (a)
- KUMATA, HIDEYA. "Attitude Change and Learning as a Function of Prestige of Instructor and Mode of Presentation." *The Impact of Educational Television*. (Edited by Wilbur Schramm.) Urbana: University of Illinois Press, 1960. p. 157-74. (b)
- MULLIN, DANIEL W. "An Experimental Study of Retention in Educational Television." *Speech Monographs* 24: 31-38; March 1957.
- SCHRAMM, WILBUR, editor. *The Impact of Educational Television*. Urbana: University of Illinois Press, 1960. 247 p.

CHAPTER V

Language Laboratories

GUSTAVE MATHIEU

THIS CHAPTER is a sequel to "Foreign Language Instruction" by Johnston (1961) in the April 1961 REVIEW. The fact that this issue devotes a special chapter to language laboratories reflects the startling impact of the subject on second-language instruction.

History

The recent dramatic growth of language laboratories is inherently linked to (a) the widespread acceptance of speaking proficiency as the primary goal of foreign language instruction and (b) the application of methods derived from scientific linguistics and programmed learning. According to the science of linguistics, language is, basically, a complex set of sounds and habits. Such speech habits are acquired most efficiently when the four language skills are developed in the following sequence: (a) understanding by ear, (b) speaking only what is understood, (c) reading initially only what is understood and spoken, and (d) writing only what is easily understood and spoken, as reinforcement of the three other skills. Only students who have acquired some proficiency in these four skills should undertake the formal analysis of grammar, or translation from the target language into English, or vice versa. These procedures, which constitute the very heart of the audiolingual method, can be used without any electromechanical aids. But they imparted tremendous momentum to the search for "hardware" that would give the student more and better acoustic practice hours with the target language.

In a comprehensive, eclectic study, Hutchinson (1961) traced the development of the language laboratory from its beginnings in the Army program of World War II to its extremely rapid increase under the stimulus of the National Defense Education Act of 1958, which provided matching funds, research support, teacher training, and institutes.

The wartime Army and Navy language programs inspired lively experimentation at a few colleges. Hayes (1952) described the 1947 development by Louisiana State University of 100 cubicles for individual listening and speaking practice. In 1951, Purdue University opened its first laboratory and, encouraged by the results, a second one two years later. Hocking (1955), stressing that a laboratory represented an instructional rather than a research device, described the operation in which students working individually with a tape-recorder-reproducer spent two of their four weekly meetings in a semi-soundproof booth, listening to prerecorded materials coming from a master instrument. In carefully timed intervals of

silence, the student would perform as directed: repeating, answering questions, rephrasing statements, writing dictation, or recording his own voice and comparing it with the master voice in critical self-evaluation. Randall (1956) cited the importance of integrating laboratory and classroom activity in such programs for pedagogical and motivational reasons.

Soon after World War II, laboratories were also installed at a number of institutions, including these universities: Texas, Rochester, Northwestern, Cornell, Yale, Georgetown, and Wayne. Such installations, which made it feasible to provide regular individual practice with *automatic tutors*, established the value of the language laboratory in instruction primarily involving hearing and speaking rather than deaf-and-dumb grammar-decoding. The use of such equipment was still further advanced by the introduction of the magnetic-tape recorder, which made it relatively simple to experiment with locally made recordings. The adaptation of the stereophonic, or dual-channel, recorder to language learning made it even more possible for the student to have complete and independent control of his program. He could now record his voice in the pauses and replay it without erasing the master voice on the upper track.

About 100 colleges and universities had some kind of language-laboratory facilities in 1950. In 1957, the number had grown to 64 installations in secondary schools and 240 in institutions of higher learning. A forthcoming U.S. Office of Education survey will reveal that more than 2500 secondary schools and more than 700 colleges and universities now have some kind of language laboratory.

Additional References: Allen (1960); Birkmaier (1960); California State Department of Education (1960); Creore (1960); Frey (1960); Harvey (1954); Hutchinson (1960); Koekkoek (1959); *MLabstracts* (1961); Reese (1960); Rust (1954); Scherer (1947); Van Eenenaam (1961); White (1961).

Instructional Materials

Such rapid growth was not without problems and potential dangers. After an initial rash of exhortatory publications, which viewed the language laboratory as either a "miracle tool" or a "mechanical monster," the more sober view prevailed, maintaining that the key to the newer approaches lay in the methods and materials rather than in the equipment. The language laboratory clearly made its greatest contribution when it was used as an integral part of a program in which instruction in hearing and speaking formed the basis for the sequential, cumulative, and carefully recycled development of language skills, each small step building deliberately on the preceding steps. The system was weakest when it was used only as an adjunct to the grammar-translation type of program. Unfortunately, some teachers were misled into believing that

the mere taping of traditional texts or use of the equipment itself constituted the audiolingual method. Others, realizing that the audiolingual method represented such a radical departure from traditional ways that it was futile to try to adapt old texts, developed their own materials and tapes. Meanwhile, a team of specialists at the Modern Language Materials Development Center under the direction of Thompson (1961) of the Glastonbury, Connecticut, Public Schools and by contract with the U.S. Office of Education, was writing and field-testing in schools across the country the first *total* audiolingual text for the secondary level in several languages. Published in 1961 as *A-LM* (Audio-Lingual Materials), this text incorporated the most recent contributions of the science of linguistics, programmed learning, and psychology of language learning and included hundreds of integrated class and laboratory exercises, take-home records for audiolingual homework, step-increment introduction of structures, and separately bound units so that the student's pronunciation would not be spoiled by the written form of the language until he had mastered it by ear alone. Similar program-texts were in preparation or being published by D. C. Heath and Company and Holt, Rinehart and Winston.

On the college level, Marty (1960), Bolinger and others (1960), and Dostert (1958)—among others—pioneered integrated classroom-laboratory courses. Eddy (1956) and others classified materials and activities for the laboratory into basic categories: (a) for listening only, in which the learner builds up aural comprehension and speaking readiness; (b) for repetition or "echoing," in which the learner mimics what he hears, improving his pronunciation and memorizing unconsciously; and (c) for the manipulation of forms and patterns, in which the learner reacts vocally to an audio stimulus and in responding manipulates the syntactical and/or morphological structures of the target language. The last activity, called pattern practice, was the most thoroughly researched, since it focused directly on the problem of how to teach correct grammatical usage through the formation of automatic habits rather than through memorization of rules and their conscious application.

Belasco (1961) and others demonstrated the application of structural linguistics to pattern practice, based on the grammar of the *spoken* language (e.g., in spoken French the plural of nouns is not communicated by the written final *s*, but by a sound change in the preceding word, or a liaison, or both). Gaarder (1956) compiled an anthology of various techniques for practicing such patterns of sound and structure through taped drills, including three-cycle drills strikingly akin to Skinner's principles of programmed learning. Each item required a response by the student and was followed by immediate feedback of the correct recorded response, to provide for correction or reinforcement. Marty (1956) and others further refined the techniques for the step-increment learning of specific structures to the point of *overlearning*, or automatic speech reflexes.

Investigators agreed that, since the response should always be controlled for reasons of immediate correction or corroboration, free-response exercises were unsuitable for machine drill. On the other hand, it was evident that abundant machine drill (minimum of 20 minutes every day), in class or in the laboratory, with carefully programmed oral exercises to maximize the learner's chances for correct performance would be impossible without equipment. The question of whether the student should repeat the correct responses remained unsettled. One solution suggested that if the student is directed to repeat it, it is preferable for the program to repeat it again, so that the student's last impression of the utterance is always that of the correct model. Besides research into the techniques for speaking skill, increasing attention was paid to listening comprehension as a primary separable learning process, basic to speaking skill and motivation (Fulton, 1959).

Additional References: Hartsook (1960); Holton and others (1961); Marty (1960); Mathieu (1959, 1961a, b, c); Pleasants (1956); Stack (1960); Sharp (1960); Valdman (1960).

Rationale for Equipment

Although the effectiveness of any equipment, however elaborate, depended on the program, certain things remained possible only for the laboratory. As summarized by Hutchinson (1961), the laboratory could provide for (a) active simultaneous participation of all students in listening and listening-speaking practice in or out of class, (b) a variety of authentic native voices as consistent and untiring models for student practice, (c) individual differences through self-instruction at the student's own learning rate, (d) teacher freedom from the tedious task of presenting repetitive drill material, (e) teacher opportunity to correct students without interrupting the work of others, (f) equal hearing conditions for all students, (g) a sense of reassuring privacy which would lessen inhibitions and reduce distractions, (h) facilities for group testing of listening and speaking skills, (i) special coordination of audio and visual materials, and (j) aid to teachers in improving their own audio-lingual proficiency. Moreover, it was only in the laboratory that a pattern drill could remain a stimulus-response exercise; in class, it deteriorated into mere repetition exercise for all but the few students who were quickest to respond.

Additional References: Brubaker (1961); Gaarder (1960); Kone (1959); Mathieu (1961b); Pimsleur (1959); Roertgen (1959); Skinner (1960).

Equipment

Companies engaged in the manufacture of language-laboratory equipment grew from 2 in 1956 to more than 20 in 1961. Together they offered

a bewildering array of gadgets. Marty (1956) and others described available or needed equipment in terms of student learning activities. Hayes (1960) outlined step-by-step procedures for designing, scheduling, and operating an installation.

Alarmed by the pitfalls lurking in hastily purchased equipment, a conference sponsored by the Modern Language Association (1961) issued "A Dozen Do's and Don'ts," which cautioned buyers to define teaching objectives first and then choose equipment that will implement them, instead of leaving the planning entirely to administrators or audiovisual specialists who may know little about foreign language teaching. Purchasers were urged to hire a consultant not employed by an equipment manufacturer to help plan, evaluate bids, and do the final checking of installed equipment. Moreover, seating and equipment should be arranged with provision for viewing as well as hearing and speaking, and the laboratory should be expendable and flexible enough to handle future demands as well as improvements in equipment and methods. Responsible experts should insist that the laboratory work be an integral part of the foreign language course, but they should not impose such a program on unwilling or unprepared teachers. The laboratory will increase rather than lighten the teacher's work, so the teaching load should be lightened for the laboratory director and released time arranged for teachers who prepare laboratory materials. A technician should also be hired, so that the teacher will not have to teach and operate the laboratory at the same time.

The *Purchase Guide for Programs in Science, Mathematics, and Modern Foreign Languages*, prepared by the Council of Chief State School Officers (1959), clarified many issues confusing to the teacher and administrator with precise explanations of the various equipment functions: listen, listen-speak, listen-speak-record, playback-listen-compare. It offered technical guidance for acoustic treatment of the room, for layout and furniture, for choice of booths (fixed, movable, convertible) and of microphones (hand-held, gooseneck, or boom type). It also suggested minimum specifications, especially in the crucial matter of frequency response and signal-to-noise ratio reaching the student's ear. As accurate perception is essential for the accurate imitation of unfamiliar sounds, Delattre (1960a, b) developed a test based on minimal pairs, such as "thin-fin," by which the layman could detect inferior fidelity; Locke (1962) demonstrated that the ability of beginners to discriminate between phonetic differences decreased markedly with the reduction of frequency response.

The realization that the reel-to-reel tape was not best suited for handling by the student prompted Morton (1961a) and others to experiment with cartridge reel-to-reel tapes and continuous-loop tapes. A thermoplastic recording process, as well as a multitrack 16- to 32-channel tape tested at Purdue University, may yet solve many problems—as, for example, those that arise in mass-testing procedures.

Should the students record and replay their own practice responses for comparison with the model utterances of the recorded program? The answer to this controversial question directly affected the cost of a laboratory installation. Locke (1960) and others assumed that maximum progress was possible only if the student could play back his responses to profit from his mistakes. However, Borglum (1959), uneasy about the element of unconscious memorization, suggested that learning time should concentrate on practice with correct models while "consigning the mistake to oblivion." The questions of whether to record, what, when, and how often are in process of research at Purdue.

Opinions continued to diverge on the question of whether the language laboratory should be used by the class as a group under the direction of a monitor-teacher (group mode) or for independent study (library mode). The group mode, commonly used in high schools because of disciplinary and scheduling problems, was questioned on pedagogic grounds by Gaarder (1960); Stack (1960) and others found the library mode better suited to the college situation, where students are more mature, since it had the advantage of allowing each student to practice independently and progress at his own rate of learning, which many considered the most valuable characteristic of the language laboratory. Watkins (1960) experimented with individual practice rooms that eliminated the wearing of earphones and solved the vexing problem of interference from ambient noises. Since the student's microphone picks up stray sounds, sound-treated booths or partitions were only a partial solution. An effective noise-canceling microphone remains to be marketed. Morton (1960a) doubted the pedagogic value of teacher-student intercommunication systems, except for the simultaneous testing of large groups.

The desire for simplicity of operation led Locke (1959) at the Massachusetts Institute of Technology to house all equipment in a remote cabinet, leaving the student to handle nothing but the loudness control in his booth. The trend to automatic remote control was also evident in Morton's (1961a, c) description of the "Dial-a-Lesson" system at the University of Michigan, which placed at the student's fingertips many master tapes that varied in difficulty, method, and voice. The language laboratory will undoubtedly become more automatic, with greater complexity but greater simplicity of operation. Transistorized units are in operation, as well as high-speed tape duplicators ("slaves") that facilitate the rapid production of enough copies of each master tape to supply individual students. Wireless systems may eliminate the need for conduits from the master console to the booths. Improved spectographs may allow comparison with visual models of correct pronunciation. Hocking (1960) predicted the fuller development of "multi-sensory" learning which would completely coordinate audio and visual materials in the laboratory. Borglum (1960) stressed the need to prepare for the not-too-distant future when audiovisual language teaching will be standard practice. Integrated audiovisual-lingual programs, in which motion

pictures from the continuous-core instrument of instruction were produced at Purdue and Wayne Universities, are under further research at other institutions (Newmark, 1961). The use of video tape represented, a step toward Morton's (1960c) concept of the "acculturation booth," which would transport the student into the simulated reality of life abroad. However, the precise role of the visual and kinesthetic experience in conjunction with the audio experience is not yet established.

Additional References: Borglum (1958); Cioffari (1961); Hocking (1961); Hutchinson (1959); Pimsleur (1959); Roertgen (1959); Tharp (1960).

The Language Laboratory as a Teaching Machine

The language laboratory's staunchest advocates felt that it can do more than *help* the teacher teach. Morton (1960a, b), demonstrating that the ultimate potential of the language laboratory lay not in the equipment but in its use, experimented with a good degree of success in the use of the laboratory for a completely mechanized, programmed, self-instructional course. Morton used the term "practice or audio rooms" for installations that serve as mere auxiliary or supporting activity to the classroom. Morton (1960c) foresaw the time when learning to speak another language would be entirely accomplished in the language laboratory, where the student would teach himself the manipulative skills of the target language. The classroom-teacher situation would be reserved exclusively for the expressive use of language—i.e., its humanistic purpose. Morton urged the recognition that second-language training requires at least partial acquisition of a purely subconscious habit before work of any intellectual nature may be accomplished and that this training must therefore begin before the point at which other humanistic disciplines are initiated. The inevitable trend toward mechanization caused Bolinger (1961) and others to warn of the danger of failing to guide students toward the humane use of skills in programs emphasizing language as a speaking skill.

The applications of the language laboratory to other fields were investigated by Morton (1961b), who described the advantages of audio stimuli and vocal response in self-instructional programs for all disciplines or skills and defended the usefulness of the machine against those who claim that it is the program alone that teaches.

Additional References: Cioffari (1961); Ferster and Sapon (1960); King (1960); Porter (1960); Trace (1959); Walsh (1960).

Summary

Research and Studies, prepared by the U.S. Department of Health, Education, and Welfare, Office of Education (1961), showed the relatively ex-

tensive experimentation under way toward full exploitation of electro-mechanical aids to language learning. Much, much more controlled research is, vitally needed, especially research into the peculiar complexities of the psychology of language learning and the subconscious mind, as well as research into the molecular events that create new habitual behavior. Fuller exploitation of the language laboratory by interdisciplinary teams as a research device should prove useful to education as a whole.

In the past few years, linguistics and electronics have made the most direct contributions, but neither could have had its beneficial impact without the revolutionary work of Skinner and others in programmed learning. By developing an audiolingual approach to all programmed instruction, the pioneers of language laboratory will in turn contribute to other fields through the knowledge they have gained in applying programming concepts to the shaping and changing of the human organism's most complex behavior—language.

Bibliography

- BELASCO, SIMON, editor. *Applied Linguistics*. Five separate guides in French, German, Spanish, Italian, Russian. Boston: D. C. Heath and Co., 1961.
- BOLINGER, DWIGHT L. "Algo más que entrenamiento." *Hispania* 45: 16-20; March 1961.
- BOLINGER, DWIGHT L., and OTHERS. *Modern Spanish. A Project of the Modern Language Association*. New York: Harcourt, Brace and Co., 1960. 496 p.
- BORLUM, GEORGE. "Consign the Mistake to Oblivion." *Bay State FL Bulletin* 2: 8-9; January 1959.
- BORLUM, GEORGE. "What Is the Audio-Visual Score Now?" *International Journal of American Linguistics* 26 (Part 2): 199-204; October 1960.
- COUNCIL OF CHIEF STATE SCHOOL OFFICERS. *Purchase Guide for Programs in Science, Mathematics, and Modern Foreign Languages*. Boston: Ginn & Co., 1959. 336 p.
- DELATTRE, PIERRE. "Testing Audio Equipment by Ear." *Audio-Visual Instruction* 5: 156; May 1960. (a)
- DELATTRE, PIERRE. "Testing Students' Progress in the Language Laboratory." *International Journal of American Linguistics* 26 (Part 2): 77-96; October 1960. (b)
- DOSTERT, LÉON. *Français. Premier Cours*. Milwaukee: Bruce Publishing Co., 1958. 482 p.
- EDDY, FREDERICK D. "The Secondary School Language Laboratory: Some Observations on Present Practices and Long Range Possibilities." *Reports of the Working Committees, 1956 Northeast Conference on the Teaching of Foreign Languages*. MAT Program. New Haven, Conn.: Yale University, 1956. p. 1-31.
- FULTON, RENEE J. "Language Laboratories Develop the Listening Ear." *Modern Language Journal* 43: 224-25; May 1959.
- GAARDER, A. BRUCE. *Foreign Language Laboratory Techniques*. Prepared as Supplement of its NEWS-LETTER by the Louisiana Foreign Language Teachers Association. Baton Rouge: Foreign Language Laboratory, Louisiana State University, 1956. 21 p. (Mimeo.)
- GAARDER, A. BRUCE. "Statement of the Possibilities and Problems of the Foreign Language Laboratory." *Bulletin of the Connecticut Audio-Visual Education Association* 19: 31-35; 1960.
- HAYES, ALFRED S. "Problems of the Language Laboratory." *Report of the Third Annual Round Table Meeting on Linguistics and Language Teaching*. (Edited by Salvatore J. Castiglione.) Series on Linguistics and Language Teaching, No. 2. Washington, D.C.: Georgetown University Press, 1952. p. 47-56.
- HAYES, ALFRED S. *Step by Step Procedures for Language Laboratory Planning: Some Suggestions for Schools and Colleges*. New York: MLA Foreign Language Program Research Center, 1960. 16 p.

- HOCKING, ELTON. "The Purdue Language Program." *PMLA* (Publications of the Modern Language Association) 70 (Part 2): 36-45; September 1955.
- HOCKING, ELTON. "Future Prospects of Language Teaching with the Use of Language Laboratories." *International Journal of American Linguistics* 26 (Part 2): 14-21; October 1960.
- HUTCHINSON, JOSEPH C. *Modern Foreign Languages in High School: The Language Laboratory*. U.S. Department of Health, Education, and Welfare, Office of Education, Bulletin 1961, No. 23. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1961. 85 p.
- *JOHNSTON, MARJORIE C. "Foreign Language Instruction." *Review of Educational Research* 31: 188-96; April 1961.
- LOCKE, WILLIAM N. "Ideal Language Laboratory Equipment." *Modern Language Journal* 43: 16-18; January 1959.
- LOCKE, WILLIAM N. "Equipment for the Language Laboratory." *International Journal of American Linguistics* 26 (Part 2): 25-40; October 1960.
- LOCKE, WILLIAM N. "Language Learning and Frequency Response." *International Journal of American Linguistics* 28 (Part 2): 62-79; January 1962.
- MARTY, FERNAND L. *Methods and Equipment for the Language Laboratory*. Middlebury, Vt.: Audio-Visual Publications, 1956. 84 p.
- MARTY, FERNAND L. *Language Laboratory Learning*. Wellesley, Mass.: Audio-Visual Publications, 1960. 256 p. (Offset)
- MODERN LANGUAGE ASSOCIATION. "A Dozen Do's and Don'ts for Planning and Operating a Language Lab or an Electronics Classroom in a High School." *PMLA* (Publications of the Modern Language Association) 76: iv; May 1961.
- MORTON, F. RAND. "The Language Laboratory as a Teaching Machine." *International Journal of American Linguistics* 26 (Part 2): 113-66; October 1960. (a)
- MORTON, F. RAND. "The Teaching Machine and the Teaching of Languages: A Report on Tomorrow." *PMLA* (Publications of the Modern Language Association) 75 (Part 2): 1-6; September 1960. (b)
- MORTON, F. RAND. "The Foreign Language Program and the Language Laboratory." *Guinn Curriculum Study*. Ann Arbor: University of Michigan, 1960. p. 43-55. (Mimeo.) (c)
- MORTON, F. RAND. "Recent Developments in the Language Laboratory Equipment for Teaching and Research." *College Language Laboratory* (Publications of the Language Laboratory, University of Michigan) 5: 1-24; 1961. (a)
- MORTON, F. RAND. "On the Advantages of Audio-Lingual Programming." Paper read at AMA Special Conference on Teaching Machines and Programmed Learning. Los Angeles, November 15-18, 1961. 7 p. (Offset) (b)
- MORTON, F. RAND. "The Secondary School Language Laboratory: Physical and Pedagogical Design for Secondary School Library and Classroom Language Laboratories." *Proceedings of the First Conference on the Role of the Language Laboratory in the Secondary School*. *College Language Laboratory* (Publications of the Language Laboratory, University of Michigan) 4: 18-35; 1961. (c)
- NEWMARK, GERALD. *A Design for a Program in Beginning Foreign Language Study Utilizing Dramatic Motion Pictures and Programmed Learning Materials: A Working Draft*. Santa Monica, Calif.: System Development Corporation, 1961. 43 p. (Offset)
- RANDALL, EARLE S. "The Language Laboratory: A New Tool." *Educational Forum* 20: 323-28; March 1956.
- STACK, EDWARD M. "Pattern Drills for the Language Laboratory." *French Review* 33: 272-80; January 1960.
- THOMPSON, MARY P., coordinator. *A-LM* (Audio-Lingual Materials). Available in French, German, Italian, Russian, Spanish. New York: Harcourt, Brace & World, 1961.
- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION. *Language Development Program: Research and Studies*. Report on the First Two Years. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1961. 39 p.
- WATKINS, JAMES M. "The Library System and the Language Laboratory." *French Review* 34: 60-66; October 1960.

* Items marked with an asterisk are good bibliographic sources.

Additional References

- ALLEN, EDWARD D. "The Effects of the Language Laboratory on the Development of Skill in a Foreign Language." *Modern Language Journal* 44: 355-58; December 1960.
- *BIRKMAIER, EMMA M. "Modern Languages." *Encyclopedia of Educational Research*. Third edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. p. 861-88.
- BORCLUM, GEORGE. "The Modern Language Audio-Visual Project." *Modern Language Journal* 42: 325-38; November 1958.
- BRUBAKER, CHARLES W. "Architecture and Equipment for the Language Laboratory." *Audio-Visual Instruction* 6: 201-16; May 1961.
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *A Guide for the Development of Language Laboratory Facilities*. Bulletin No. 10. Sacramento: the Department, October 1960. 37 p.
- CIOFFARI, VINCENTO. "What Can We Expect from the Language Laboratory?" *Modern Language Journal* 45: 3-9; January 1961.
- *CREORE, FRANCES B. "The New Media in Language Teaching: A Status Study." *Audio-Visual Instruction* 5: 286-93; November 1960.
- FERSTER, CHARLES B., and SAPON, STANLEY M. "An Application of Recent Developments in Psychology to the Teaching of German." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 173-85.
- FREY, WILLIAM J. "You Too Can Have a Language Laboratory." *Bulletin of the Connecticut Audio-Visual Education Association* 19: 37-44; 1960.
- GAARDER, A. BRUCE. "Language Laboratory Techniques: The Teacher and the Language Laboratory." *International Journal of American Linguistics* 26 (Part 2): 41-50; October 1960.
- HARTSOOK, JOHN H. "The Function and Techniques of the Foreign Language Laboratory." *Bulletin of the Connecticut Audio-Visual Education Association* 19: 15-24; 1960.
- HARVEY, HOWARD G. "From Language Laboratory to Television Studio." *Modern Language Journal* 38: 282-89; October 1954.
- HOCKING, ELTON. "Language Laboratories." *Nation's Schools* 67: 83-86; February 1961.
- HOLTON, JAMES S., and OTHERS. *Sound Language Teaching: The State of the Art Today*. New York: University Publishers, 1961. 249 p. Contains glossary.
- HUTCHINSON, JOSEPH C. "Mass Oral Testing by Remote Control." *Hispania* 42: 466-70; September 1959.
- HUTCHINSON, JOSEPH C. "The National Situation in the Field of Language Laboratories." *International Journal of American Linguistics* 26 (Part 2): 3-13; October 1960.
- KING, P. E. "Teaching Machines and the Language Laboratory." *American School Board Journal* 141: 17-18, 35; August 1960.
- KOEKKOEK, B. J. "The Advent of the Language Laboratory." *Modern Language Journal* 43: 4-5; January 1959.
- KONE, ELLIOT H., issue editor. "Language Laboratories: Modern Techniques in Teaching Foreign Languages." *Bulletin of the Connecticut Audio-Visual Education Association*, Vol. 19. New Haven: Yale University Audio-Visual Center, 1959. 190 p.
- MARTY, FERNAND. "Language Laboratory Methods and Techniques." *International Journal of American Linguistics* 26 (Part 2): 51-76; October 1960.
- MATHIEU, GUSTAVE. "Automated Language Instruction: A New Deal for Student and Teacher." *Automated Teaching Bulletin* 1: 5-9; December 1959.
- MATHIEU, GUSTAVE. "Recommendations on the Learnings Which Should Occur in the Language Lab and in the Classroom." *College Language Laboratory* (Publications of the Language Laboratory, University of Michigan) 5: 58-95; 1961. (a)
- MATHIEU, GUSTAVE. "Choral Pattern Drills." *Modern Language Journal* 45: 215-16; May 1961. (b)
- MATHIEU, GUSTAVE. "On the Anatomy of Listening-Comprehension." *French Review* 35: 50-53; October 1961. (c)

- MLabstracts, three times per year, Department of Foreign Languages and Literature, Orange County State College, Fullerton, California, beginning 1961.
- PIMSLEUR, PAUL. "The Functions of the Language Laboratory." *Modern Language Journal* 43: 11-15; January 1959.
- PLEASANTS, JEANNE V., editor. *Audio-Visual Techniques in the Teaching of Foreign Languages*. New York: Columbia University, 1956. 78 p. (Mimeo.)
- PORTER, DOUGLAS. "A Report on Instructional Devices in Foreign Language Teaching." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 186-205.
- REESE, HERBERT J. "A Title III Language Laboratory Planning, Use and Evaluation." *International Journal of American Linguistics* 26 (Part 2): 99-103; October 1960.
- ROERTGEN, WILLIAM F. "The Functional Language Laboratory." *Modern Language Journal* 43: 6-10; January 1959.
- RUST, ZELL O. "The Language Laboratory in Southern California." *Modern Language Forum* 39: 25-39; June 1954.
- SCHERER, GEORGE A. C. "Oral Work with the Wire Recorder." *Modern Language Journal* 31: 261-65; May 1947.
- SKINNER, BURRHUS F. "Special Problems in Programming Language Instruction for Teaching Machines." *International Journal of American Linguistics* 26 (Part 2): 167-84; October 1960.
- STACK, EDWARD M. *The Language Laboratory and Modern Language Teaching*. Fair Lawn, N.J.: Oxford University Press, 1960. 158 p.
- THARP, ROBERT N. "Development of Audio-Visual Techniques Used at the Institute of Far Eastern Languages, Yale University." *Bulletin of the Connecticut Audio-Visual Education Association* 19: 75-85; 1960.
- TRACE, ARTHUR S., JR. "The New Look in Foreign Language Instruction: Threat or Promise." *Modern Language Journal* 43: 382-86; December 1959.
- VALDMAN, ALBERT. "From Structural Analysis to Pattern Drill." *French Review* 34: 170-81; December 1960.
- *VAN EENENAAM, EVELYN, compiler. "Annotated Bibliography of Modern Language Methodology for 1959." *Modern Language Journal* 45: 24-43; January 1961.
- WALSH, DONALD D. "A Clearer Look at the New Look." *Modern Language Journal* 44: 168-70; April 1960.
- WHITE, LAWRENCE B. "Analysis of Problems of Maintenance and Operation of Language Laboratories in California High Schools." *California Schools* 32: 437-55; November 1961.

CHAPTER VI

• Self-Teaching Devices and Programmed Materials

HARRY F. SILBERMAN *

ARTICLES on self-teaching devices and programmed materials generally cluster into three groups: (a) general discussion papers, (b) programming experiments, and (c) studies in which conventional instructional procedures are compared with programmed instruction. Research articles on programmed instruction appear in a variety of places ranging from the engineering and psychology journals to mimeographed institutional reports with limited circulation. If the extent of our understanding of the learning process were proportional to the rate of increase in articles on programmed learning, most educational problems would be solved within the next decade.

Summaries and Reviews

The first book on programmed instruction to make its appearance was edited by Galanter (1959) and included a series of papers read at a symposium at the University of Pennsylvania under the auspices of the Air Force Office of Scientific Research in December 1958. A book of readings edited by Lumsdaine and Glaser (1960) is the most comprehensive source of information now available in this field. Another complete book on teaching machines was written by Stolurow (1961b). A number of surveys and literature reviews have also appeared during the past three years (Carr, 1959; Silverman, 1960a; Fry, Bryan, and Rigney, 1960; Kopstein and Shillestead, 1961; Fattu, 1960; Darby, 1959; Morrill, 1961; Finn and Perrin, 1962). Periodicals which contain news, articles, and reviews on programming plus research abstracts were edited by Lumsdaine (1960, 1961), Filep (1961), Hyer (1961), and Moon (1961). The automated-teaching bulletin started by the Rheem Califone Corporation will continue to be published by the Center for Programed Instruction as the *Journal of Programed Instruction* under the editorship of Hanson (1962). Other general works on programmed instruction included those by Markle, Eigen, and Komoski (1961), Cram (1961), Teaching Machines Incorporated-Grolier (1961), and Epstein and Epstein (1961). The implications of learning theories for the development and use of audiovisual materials were described in a series of papers edited by Meierhenry (1961).

Program Variables

The experiments on programming variables have concentrated on three problem areas. The first problem area concerns the definition of the re-

* The writer is indebted to Melvyn D. Croner for bibliographic assistance in the early stages of preparation of the manuscript.

sponses the student makes to the items. This includes comparisons of different response modes. A second problem area centers on the methods of eliciting the desired responses from the student. This includes the step size and the sequencing problems and comparisons of different prompting and confirmation methods. The third problem area centers on the adaptation of programs to individual differences. This includes the problems of branching, pacing, and repetition.

Definition of Response Modes

A number of studies have compared multiple-choice with constructed response modes. Coulson and Silberman (1960) found no significant difference between the two response modes on a posttest which required constructed responses. Their results indicated that the multiple-choice response mode required significantly less time than the constructed response mode. Zuckerman, Marshall, and Groesberg (1961) compared constructed responses, multiple-choice responses, and true-false responses on a 60-item program on electricity. They, too, found no significant differences between these response modes on gain scores. Roe and others (1960), using 230 items on elementary probability, also compared these response modes and found no significant difference in posttest scores, but the multiple-choice response mode required less training time than did the constructed response mode. Using flash cards, Fry (1960) trained students to a criterion of two correct responses to a set of Spanish words and phrases. On a posttest of eight constructed-response test items, the constructed-response condition was superior to the multiple-choice-response condition, but required significantly greater training time.

Gagne and Brown (1961) studied some response factors in the programming of conceptual learning. They compared a guidance-discovery method, a discovery method, and a rules-and-example method, using as a criterion the time required to solve a transfer problem. They found guidance-discovery most effective, followed by discovery, with rules and examples least effective. It was concluded that the guidance-discovery program using small steps required the student actively to produce conceptualization, a feature that may be lacking in the rules-and-example program, in which the student has but to read and copy material. The discovery method containing large steps may also produce such conceptualization, but in a less systematic manner.

Another response-mode issue which has received some attention is the cruciality of the required response. Holland (1960) prepared three versions of a program. In one version, material of a trivial but easy nature was left blank. Another version of the same lessons had blanks which rendered the items ambiguous and difficult and provided for a large number of errors. A third group had complete statements; there were no blanks. A fourth group, acting as a control, used the standard or normal program in which the choice of the word to be left blank required that the student

notice the critical material which that item was intended to teach. The normal group using the regular program made fewer errors on a posttest than did the other three groups. Those who had only to read complete items were somewhat better than the ambiguous group. It was concluded that items must be so written that the ability to answer the item correctly depends on noticing the critical information in the item.

A response-mode issue which has received considerable attention is the question of whether an overt response is required of the student taking the program. Goldbeck (1960) studied the interaction between response mode and learning-material difficulty, using 35 items. He found the overt response mode superior at intermediate difficulty levels but less effective at the easy level of difficulty. The overt response mode required more training time and was less efficient than both a reading and a covert response mode. Holland (1960) compared three conditions: one group used the standard or normal program; a second group also used the standard program, but received no confirmation following their responses; a third group had only to read complete statements. His reading group made more errors than either of the two overt-response groups, but the overt-response groups required significantly more time to complete the experimental material. In several studies using a variety of programs, investigators have found the covert response mode more efficient than the overt response mode (Roe and others, 1960; Hughes, 1961b; Evans, Glaser, and Homme, 1960a; Silverman and Alter, 1960; Sidowski, Kopstein, and Shillestead, 1961; Silberman, Melaragno, and Coulson, 1961). Silverman (1960b) compared a writing response, a writing-and-vocalizing response, a vocalizing response, and a covert response mode, and found better learning for the covert-response group than for any of the overt-response groups. Krumboltz and Weisman (1961) compared overt and covert response modes and obtained superiority of the overt response on a criterion test delayed two weeks, but found no differences on an immediate posttest. No record was made of the amount of time students spent on the program; the groups had been given the materials to take home and use for three days. Other studies have found no significant difference between overt and covert response modes (Evans, Glaser, and Homme, 1960b; Keislar and McNeil, 1961; Silverman and Alter, 1961; Goldbeck, Campbell, and Llewellyn, 1960; Kormondy, 1960). In general, the covert response mode results in more efficient learning than the overt response modes. However, these studies, which were of short duration, used programs of approximately 100 items. Consequently, these findings cannot be generalized to the ongoing classroom situation in which longer programs would be used.

Eliciting Desired Responses

Prescribed methods for eliciting the correct response have included the use of small steps, careful sequencing, and immediate knowledge of results. In general, experiments comparing small-step and large-step programs

have demonstrated superior learning with the small-step program, but only at the expense of added training time (Evans, Glaser, and Homme, 1960b; Coulson and Silberman, 1960; Campbell, 1961). Smith and Moore (1961), using a spelling program, found no differences in learning with different step sizes. Skinner (1958) maintained that programs should be written in small steps in order to maximize positive reinforcement and minimize negative reinforcement. Melaragno (1960) found that massed negative reinforcement depressed the learning of a set of logic symbols, while spaced negative reinforcement did not depress learning significantly.

Although immediate knowledge of results has been the method of providing reinforcement in most programs, the studies of this variable have been equivocal. Bryan and Rigney (1956) found that a group receiving explanation did better than a group receiving only right or wrong confirmation. In a follow-up study, Bryan, Rigney, and Van Horn (1957) found no difference among three kinds of explanation given for incorrect response. Meyer (1960) found that learning is significantly improved by immediate confirmation. Evans, Glaser, and Homme (1960a), on the other hand, failed to obtain performance decrement with delayed confirmation.

Several studies compared a logical or ordered program sequence with a random or scrambled program sequence. Generally no significant differences on posttest scores were obtained between groups receiving the random and ordered programs (Zuckerman, Marshall, and Groesberg, 1961; Gavurin and Donahue, 1960; Roe, Case, and Roe, 1961; Levin, 1961). Unfortunately, since these studies were conducted with very short programs, they cannot be generalized to longer ones. The study by Gavurin and Donahue (1960), using 29 psychology items on 40 subjects, did show that the logical sequence took significantly fewer trials to reach criterion performance during acquisition. Mager (1961) found that six adult learners who were allowed to generate their own program sequence by asking questions of their instructor developed content sequences which bore little resemblance to the conventionally written "logical" sequences of the same topics.

A number of studies have made some form of comparison between a prompting and a confirmation procedure. In the conventional confirmation procedure, the stimulus term is presented followed by a student response, and then the response term is presented. In the prompting condition, the stimulus and response terms are not separated by the student response. In general, the short-term studies which have been conducted on this issue tend to favor prompting over confirmation. Experiments by Cook and Kendler (1956), Cook (1958), and Cook and Spitzer (1960) presented evidence that a prompting procedure is superior to a confirmation method in the learning of paired associates. Cook and Spitzer (1960) noted that their confirmation procedure represented the paradigm for teaching machine programs. Irion and Briggs (1957), using the "subject matter trainer" (Briggs, 1958), found prompting to be more effective in serial

learning, paired-associate learning, and problem solving. Kopstein and Roshal (1955) found superior paired-associate learning when the stimulus and response members were presented simultaneously. Silberman and others (1961) and Silberman, Melaragno, and Coulson (1961) found supporting evidence for the efficiency of prompting over confirmation. Campbell (1961), using eight subjects, found no significant difference between a prompting condition and a method of indirect cueing of overt responses.

Using Russian-English paired-associate material, Sidowski, Kopstein, and Shillestead (1961) supported Cook's (1958) findings with an improved experimental design. Employing paired associates, Angell and Lumsdaine (1960) compared a condition of pure prompting with a condition which included both prompting and confirmation and obtained a difference in favor of the partial-prompting condition. In another paired-associate study, Angell and Lumsdaine (1961a) compared prompting and confirmation with different kinds of confirmation ranging from a partial right-wrong indication only to full confirmation giving the correct answer. Prompting was found more effective than confirmation when partial confirmation was used, but no differences were obtained with full confirmation. This study used paired-associate material with 16 subjects.

In a related study, Angell and Lumsdaine (1961b) found no difference between a condition in which the subject was allowed to control the cues that were presented to him and the conventional confirmation procedure. Stolurow (1961a) compared prompting and confirmation procedures in teaching vocabulary to retarded children at two degrees of overlearning. With the shorter practice period, prompting was superior to confirmation; but with the longer practice period, confirmation proved superior to prompting with respect to retention. Differences in training time were not reported in this study, but under both practice conditions the prompting group required fewer trials to acquire learning. In a study by Kaess and Zeaman (1960), subjects learning in what essentially amounts to a prompting condition made significantly fewer errors on subsequent trials than groups using confirmation procedures. Shettel and Lindley (1961) found that adult students learned the phonetic alphabet more efficiently by reading flash cards than with a long self-instructional program using confirmation procedures.

Although not directly related to the prompting-confirmation issue, a number of studies have been concerned with methods of prompting or cueing. Using a method of varying the physical clarity of the prompt, Israel (1960) found that successively smaller amounts of prompting were required for correct responding as learning progressed. Taber and Glaser (1961) employed a method of progressively reducing the size of color cues in teaching first-graders to name eight colors. Popp and Porter (1960) illustrated a method of teaching children initial-letter sounds by means of progressively vanishing portions of a picture prompt.

Adaptation of Programs to Individual Differences

The third problem area is concerned with the adaption of programs to individual differences. This includes problems of branching, pacing, and repetition.

Several studies have made comparisons between branching and linear programs. Coulson and Silberman (1960) found that subjects with a very limited form of branching learned as well as, and in a shorter time than, those taught without branching. Using a computer as a control unit in a follow-up study, Silberman and others (1961) found no significant difference between a branching and a fixed-sequence version of a logic program. Modification of the remedial items and the branching structure of this program resulted in superior learning by the branching group (Coulson and others, 1961). Campbell (1961) compared a branching program with three linear programs of different length and found no significant difference on a posttest. In a comparison between a branching and a linear program, Mager (1959) found superior performance on the part of the linear group on a calibration task, but this group had taken more training time.

Comparisons have also been made between programs in which the student was allowed to move at his own pace and programs in which the student was required to move at a pace established by the experimenter. Two studies found no significant difference in learning between experimenter-paced and student-paced methods (Briggs, Plashinski, and Jones, 1955; Silverman and Alter, 1961). Using a program containing first-aid information, Follett (1961) found self-pacing to be superior to forced pacing on an efficiency measure incorporating test score, training time, and testing time. In such studies, it appears as if the learning decrement is a function of the rate at which forced pacing occurs.

The question of how much review or repetition is required of a student traversing a program has received some attention. Kormondy (1960) found no differences between programs with and without review items. Ferster (1961), using 61 lessons from the Skinner-Holland psychology program, compared two groups, one of which received a single trial through the program, while the other received a single trial and one repetition. No differences in learning were obtained, but the single-trial condition required less training time. Holland and Porter (1960) were concerned with the effect of repeating missed items, a characteristic of machines incorporating the "dropout" feature. They compared the repetition of incorrectly answered items with a condition in which incorrectly answered items were not repeated. They found that the group receiving repetitive experience, in contrast to the one not having such experience, made significantly fewer errors on a criterion test at four levels of item difficulty, both on an immediate test and a retest. Six months later, however, the group undergoing repetitive activities required significantly more training time. Rothkopf (1961) found no significant difference between two degrees

of review (items dropped after one *versus* two correct responses) in learning eight paired-associate items.

In general, programs have not been adapted to individual differences in aptitude, except that students may traverse programs at different rates. Skinner (1958) has suggested that a program may be designed which is suitable for both the slow and fast student. Using spelling materials, Porter (1959) found no relationship between IQ measures and achievement. Ferster and Sapon (1958) also found no correlation between aptitude and achievement. Adding further support to the contention that one program is sufficient for different ability levels, Shay (1961) found no relationship between intelligence and step size on a teaching machine program where step size was inferred from measurement of the number of errors made on a Roman-numerals program.

Comparisons with Conventional Instruction

A growing number of studies reported the results of field tests featuring global comparisons of programmed and conventional instruction. The results of these studies generally tended to favor the program. There is some indication, however, that the students in many of the conventional classes which had a fixed training interval may not have received the same material or may not have used their time as efficiently as they could, because comparisons of programmed lectures, programmed textbooks, and programmed machines yielded no significant differences. In studies comparing conventional and programmed instruction, the programmed groups usually took less training time. Perhaps the experimental groups only worked on test-relevant material, while control groups covered a wider range of topics. Conditions of conventional instruction were seldom described in such reports. The Hawthorne or novelty effect may also have been operating.

Most of the work by Pressey and his associates has been cited in earlier summaries and reviews. Generally these studies demonstrated the advantages of using a punchboard as a device for providing immediate knowledge of results over conventional instructional procedures. In addition to the work with the punchboards, some of Pressey's associates experimented with a chemically treated paper for providing immediate knowledge of results. A number of recent studies have shown that programmed instruction is superior to conventional instruction (Hughes, 1961a, b; Klaus and Lumsdaine, 1960; Smith and Quackenbush, 1960; Hatch, 1959; Calvin, 1960; Porter, 1959). Other studies showed no significant difference in learning between conventional and programmed groups (Oakes, 1960; Benson and Kopstein, 1961; Ferster and Sapon, 1958; Lewis, 1961; Hickley and Anwyll, 1961). Zuckerman, Marshall, and Groesberg (1961), using 60 items on Ohm's law and circuits with Brooklyn College students, reported results which differ from the general findings. They compared the learning

efficiency of a textbook, a lecture, a programmed booklet, and a teaching machine. They found the textbook most efficient, followed by the lecture, and then the programmed booklet, with the teaching machine least effective. In the discussion of the experiment, the authors pointed out that the program was perhaps not sufficiently well developed to compare favorably with text and lecture.

A number of studies compared the effectiveness of using programmed instruction with, and without, the use of the machine. No significant differences were found between the machines and programmed texts (Eigen and Komoski, 1960; Roe and others, 1960; Holt and Hammock, 1961). Follettie (1961) compared a lecture, a tape, a plain book, and a scrambled book in teaching first-aid information. He found the plain book superior to the scrambled book and both book forms superior to the tape or lecture.

Although learning efficiency is generally greater with programmed instruction than with conventional lectures, neither Roe and others (1960) nor Wendt (1961) was able to find a significant difference in learning between programmed materials and a programmed lecture.

In a number of studies, evidence is reported that the programmed-instruction group performed significantly better than a zero group or a no-instruction group (Coulson and Silberman, 1960; Hatch, 1959; Keislar, 1959).

Trends and Problems

The most popular finding in the studies reported in this period is that no significant differences were obtained among treatment comparisons. When significant differences were obtained, they seldom agreed with findings of other studies on the same problem. It is to be expected that non-significant differences are the rule rather than the exception. One cannot help wondering, however, whether these variables really have little effect on learning or whether they have not been adequately tested. Among the experiments reviewed, it was not uncommon to find very short programs administered in one or two hours to small samples of highly motivated students who viewed the program as a test, followed immediately by a short improvised quiz. Generally, wide individual differences and high levels of drive completely mask out treatment effects, even when criterion measures are sensitive enough to detect such differences. Results that conflict with findings of other studies can often be attributed to differences in study time or to differences in the extent to which the training task is similar to the criterion task. More often, the programs, the sample of students, the criteria, and the conditions of administration are not at all comparable, even though the same independent variables are being studied. Those differences which have been obtained, often at the cost of giving one group extra information or added training time, may wash out on transfer tests given after short retention intervals, but such measures are seldom reported.

Generally, when an investigator refuses to accept null findings, he is suspicious of the adequacy of the treatment conditions rather than of the criterion instrument. Yet the characteristics of the criterion may have determined the conclusions of his study. Weitz (1961) has provided examples in which choice of criteria determines the conclusions of learning studies. The difficulty of the criterion, the extent of similarity with the training materials, the decision of when to administer the criterion instrument, the choice of performance measure—each determines in some way the results of the study. An important neglected issue in current research on programming variables is the problem of choosing evaluative criteria.

Since the purpose of a program-evaluation test is to measure the behavior that should have been produced in all the students receiving the program, the items may be very easy. Such items do not discriminate among students and, therefore, result in low item-discrimination indexes. Hence, traditional item-analysis data may not be particularly useful for program-evaluation tests. Effective programs yielding a very limited spread of scores on a post-test attenuate any coefficients which are a function of variance among the test scores. The validity of a test, therefore, must be judged in terms of relevance of content and objectives as well as statistical indexes. If the test items sample the essential subject matter that the student has learned from the program, and if items are not eliminated on the basis of item-test discrimination, correlations between success or failure on each item and the criterion score may be zero, if everyone answers each item correctly. Such a test may not discriminate well among students who have received the program, but may still discriminate between students who have received the program and those who have not.

Hammock (1960) has suggested that test items be selected on the basis of their ability to discriminate between students who have and have not received the training, rather than among students of whom all have received training. Gilpin (1961) proposed that programs with the same objectives that produced perfect criterion performance on such a test may be compared on the basis of their efficiency, as measured by the time required to complete the program. In most cases, however, all students will not receive a perfect test score. What is needed is a standard method for expressing learning efficiency in terms of both test performance and cost factors. Follett (1961) developed an index which incorporates accuracy of performance, training, and test time.

Ideally, it would be desirable to identify specific structural features of programs which contribute to their effectiveness. This would greatly simplify the evaluation of programs. Unfortunately, such relationships have not been established. Beyond demonstrating that a carefully written set of materials will teach if a student will spend enough time studying them, we have little unequivocal evidence for principles of programmed instruction. Comparisons between programmed and conventional instruction, however, generally show that programs are at least as good as conventional procedures and certainly better than no instruction at all.

There seems to be a general trend toward increased variety in programming procedures, with the rapid disappearance of the branching-linear dichotomy. Evans, Glaser, and Homme (1960c) have developed a Ruleg programming system, and Gilbert (1961) has developed a programming system called mathetics. A trend toward more diversified research approaches to programmed instruction is evident. While most of the studies cited in this chapter were of the conventional hypothesis-testing variety, an increasing number of analytic studies, field tests, case studies, and single-organism exploratory studies are being conducted. Much of the earlier research utilized conventional subject matter such as mathematics, science, and languages. New programs are, however, being developed with behavioral objectives other than the traditional subject-matter areas: for example, programs are being written specifically to establish inductive-reasoning behavior, creativity, and problem solving. An increasing amount of programming activity is beginning to be exerted at the lower-grade levels, while most of the earlier programs were designed for adults.

It is to be expected that the heightened research activity in programmed instruction will lead toward more carefully written, empirically developed textbooks; toward instruction that is more directly contingent on frequent testing; toward a greater relative emphasis on development of instructional materials, in contrast to the presentation of those materials; toward a greater effort devoted to the maintenance or retention of learning, in contrast to its acquisition; and toward a greater emphasis on specifying the behavioral goals of education. The programming research signals a shift in emphasis toward placing a greater burden of responsibility for learning on the quality of the instructional materials.

Bibliography

- ANCELL, DAVID, and LUMSDAINE, ARTHUR A. *Prompted plus Unprompted Trials Versus Prompted Trials Alone in Paired-Associate Learning*. Research Report AIR-314-60-IR-129. Pittsburgh: American Institute for Research, October 1960. 19 p. (Mimeo.)
- ANCELL, DAVID, and LUMSDAINE, ARTHUR A. *The Effects of Prompting Trials and Partial-Correction Procedures on Learning by Anticipation*. Research Report AIR-C14-9/61-SR5. San Mateo, Calif.: American Institute for Research, September 1961. 47 p. (Mimeo.) (a)
- ANCELL, DAVID, and LUMSDAINE, ARTHUR A. *A Study of Subject-Controlled Partial Cueing in Paired-Associate Learning*. Research Report AIR-C14-9/61-SR4. San Mateo, Calif.: American Institute for Research, September 1961. 13 p. (Mimeo.) (b)
- BENSON, EUGENE W., and KOPSTEIN, FELIX F. *Machine Teaching of Basic Electronics at Keesler Air Force Base: An Experiment*. Paper presented at the convention of the Department of Audio-Visual Instruction, National Education Association, Miami, Florida, April 1961. 5 p. (Mimeo.)
- BRIGGS, LESLIE J. "Two Self-Instructional Devices." *Psychological Reports* 4: 671-76; December 1958.
- BRIGGS, LESLIE J.; PLASHINSKI, D.; and JONES, D. L. *Self-Pacing Versus Automatic Pacing of Practice on the Subject-Matter Trainer*. Unpublished Laboratory Note AFPTRC, ASPRL-LN-55-8. Lowry Air Force Base, Colo.: Armament Systems Personnel Research Laboratory, September 1955. 6 p. (Mimeo.)

- BRYAN, GLENN L., and RIGNEY, JOSEPH W. *An Evaluation of a Method for Ship-board Training in Operations Knowledge*. Technical Report No. 18. Los Angeles: Electronics Personnel Research Group, Department of Psychology, University of Southern California, September 1956. 36 p. (Mimeo.)
- BRYAN, GLENN L.; RIGNEY, JOSEPH W.; and VAN HORN, CHARLES. *An Evaluation of Three Types of Information for Supplementing Knowledge of Results in a Training Technique*. Technical Report No. 19. Los Angeles: Electronics Personnel Research Group, Department of Psychology, University of Southern California, April 1957. 23 p. (Mimeo.)
- CALVIN, ALLEN. *Preliminary Report on the Roanoke Programmed Textbook Project*. Roanoke, Va.: Hollins College, 1960. 19 p. (Mimeo.)
- CAMPBELL, V. N. *Adjusting Self-Instruction Programs to Individual Differences: Studies of Cueing, Responding and Bypassing*. AIR-C41-7/61-SR. San Mateo, Calif.: American Institute for Research, July 1961. 38 p. (Mimeo.)
- CARR, WILLIAM J. *Self-Instructional Devices: A Review of Current Concepts*. WADC Technical Report 59-503. Wright-Patterson Air Force Base, Ohio: Aero-Space Medical Laboratory, August 1959. 23 p. (Offset)
- COOK, JOHN O. "Supplementary Report: Processes Underlying Learning a Single Paired-Associate Item." *Journal of Experimental Psychology* 56: 455; May 1958.
- COOK, JOHN O., and KENDLER, TRACY S. "A Theoretical Model To Explain Some Paired-Associate Learning Data." *Symposium on Air Force Human Engineering, Personnel and Training Research*. (Edited by Glen Finch and F. Cameron.) National Research Council Publication No. 455. Washington, D.C.: the Council, 1956. p. 90-98.
- COOK, JOHN O., and SPITZER, MORTON E. "Supplementary Report: Prompting Versus Confirmation in Paired-Associate Learning." *Journal of Experimental Psychology* 59: 275-76; April 1960.
- COULSON, JOHN E., and SILBERMAN, HARRY F. "Effects of Three Variables in a Teaching Machine." *Journal of Educational Psychology* 51: 135-43; June 1960.
- COULSON, JOHN E., and OTHERS. *Effects of Branching in a Computer-Controlled Auto-Instructional Device*. Technical Memorandum 617. Santa Monica, Calif.: System Development Corporation, May 1961. 8 p. (Mimeo.)
- CRAM, DAVID. *Explaining Teaching Machines and Programming*. San Francisco, Calif.: Fearon Publishers, 1961. 86 p.
- DARBY, CHARLES L. *An Annotated Bibliography on the Automation of Instruction*. Research Memorandum. Fort Bliss, Tex.: Hum RRO, U.S. Army Air Defense Human Research Unit, July 1959. 36 p. (Offset)
- EIGEN, LEWIS D., and KOMOSKI, P. KENNETH. "Research Summary Number 1. Automated Teaching Project." New York: Collegiate School, June 1960. 7 p.
- EPSTEIN, SAM, and EPSTEIN, BERYL. *The First Book of Teaching Machines*. New York: Franklin Watts, 1961. 50 p.
- EVANS, JAMES L.; GLASER, ROBERT; and HOMME, LLOYD E. *An Investigation of "Teaching Machine" Variables Using Learning Programs in Symbolic Logic*. Report prepared under Cooperative Research Program No. 691 (9417), U.S. Office of Education. Pittsburgh: Department of Psychology, University of Pittsburgh, December 1960. 79 p. (Mimeo.) (a)
- EVANS, JAMES L.; GLASER, ROBERT; and HOMME, LLOYD E. "A Preliminary Investigation of Variation in the Properties of Verbal Learning Sequences of the 'Teaching Machine' Type." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumadaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 446-51. (b)
- EVANS, JAMES L.; GLASER, ROBERT; and HOMME, LLOYD E. *The Rule System for the Construction of Programmed Verbal Learning Sequences*. Report prepared under Cooperative Research Project No. 691 (9417), U.S. Office of Education. Pittsburgh: Department of Psychology, University of Pittsburgh, August 1960. 17 p. (Mimeo.) (c)
- FATTU, NICHOLAS A. "Training Devices." *Encyclopedia of Educational Research*. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. p. 1529-35.
- FERSTER, CHARLES B. *The Role of Review Material in Continuous Programming with Teaching Machines*. Final Report, U.S. Office of Education Grant No. 7-12-06700. Bloomington: University of Indiana, 1961. 3 p. (Mimeo.)

- FERSTER, CHARLES B., and SAPON, STANLEY M. "An Application of Recent Developments in Psychology to the Teaching of German." *Harvard Educational Review* 28: 58-69; Winter 1958.
- FILEP, ROBERT T., editor. *Programed Instruction*. New York: Center for Programed Instruction (365 West End Avenue), beginning May 1961.
- FINN, JAMES D., and PERRIN, DONALD G. *Teaching Machines and Programed Learning, 1962: A Survey of the Industry*. Occasional Paper No. 3, Technological Development Project. Washington, D.C.: National Education Association, 1962. 85 p. (Offset)
- FOLLETTIE, JOSEPH F. *Effects of Training Response Mode, Test Form, and Measure on Acquisition of Semi-Ordered Factual Materials*. Research Memorandum 24. Fort Benning, Ga.: U.S. Army Infantry Human Research Unit, April 1961. 62 p. (Mimeo.)
- FRY, EDWARD B. "A Study of Teaching Machine Response Modes." *Teaching Machines and Programed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 469-74.
- FRY, EDWARD B.; BRYAN, GLENN L.; and RIGNEY, JOSEPH W. "Teaching Machines: An Annotated Bibliography." *AV Communication Review*. Vol. 8, Supplement No. 1. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. 80 p.
- GAGNE, ROBERT M., and BROWN, LARRY T. "Some Factors in the Programming of Conceptual Learning." *Journal of Experimental Psychology* 62: 313-21; October 1961.
- GALANTER, EUGENE, editor. *Automatic Teaching: The State of the Art*. New York: John Wiley & Sons, 1959. 198 p.
- GAVURIN, EDWARD I., and DONAHUE, VIRGINIA M. *Logical Sequence and Random Sequence Teaching Machine Programs*. MEC 520 TM 3088 (60-61). Burlington, Mass.: Radio Corporation of America, July 1960. 16 p. (Offset)
- GILBERT, THOMAS F. *Mathetics: The Technology of Education*. New York: TOR Laboratories (55 Fifth Avenue), 1961. 49 p. (Mimeo.)
- GILPIN, JOHN. *Design and Evaluation of Instructional Systems*. Paper presented in a symposium at the 1961 meetings of the American Psychological Association. (U.S. Office of Education Grant No. 7-12-026.00.) Richmond, Ind.: Earlham College, 1961. 8 p. (Mimeo.)
- GOLDBECK, ROBERT A. *The Effect of Response Mode and Learning Material Difficulty on Automated Instruction*. Technical Report No. 1, AIR-328-60-IR-124. Santa Barbara, Calif.: American Institute for Research, September 1960. 36 p. (Mimeo.)
- GOLDBECK, ROBERT A.; CAMPBELL, VINCENT N.; and LLEWELLYN, JOAN E. *Further Experimental Evidence on Response Modes in Automated Teaching*. Technical Report No. 3, AIR-328-60-IR-132. Santa Barbara, Calif.: American Institute for Research, December 1960. 24 p. (Mimeo.)
- HAMMOCK, JOSEPH. *Criterion Measures: Instruction vs. Selection Research*. Murray Hill, N.J.: Bell Telephone Laboratories, September 1960. 8 p. (Offset)
- HANSON, LINCOLN F., editor. *Journal of Programed Instruction*. New York: Center for Programed Instruction (365 West End Avenue), beginning 1962.
- HATCH, RICHARD S. *An Evaluation of the Effectiveness of a Self-Tutoring Approach Applied to Pilot Training*. WADC Technical Report 59-320. Wright-Patterson Air Force Base, Ohio: Aero-Space Medical Laboratory, July 1959. 19 p. (Offset)
- HICKLEY, ALBERT E., and ANWYLL, B. JEAN. *Programmed Instruction of Package Billing Clerks*. Final Report to Speigel, Inc. Lexington, Mass.: Information Technology Laboratories (a division of Itel), January 1961. 30 p. (Mimeo.)
- HOLLAND, JAMES G. *Design and Use of a Teaching Machine Program*. Paper presented at the 1960 American Psychological Association convention as part of the symposium entitled "Automated Teaching Methods in Undergraduate Instruction and Educational Research." Cambridge, Mass.: Harvard University, September 1960. 7 p. (Mimeo.)
- HOLLAND, JAMES G., and PORTER, DOUGLAS. *The Influence of Repetition of Incorrectly Answered Items in a Teaching-Machine Program*. Paper presented at the 1960 American Psychological Association convention. Cambridge, Mass.: Harvard University, September 1960. 4 p. (Mimeo.)
- HOLT, HOWARD O., and HAMMOCK, JOSEPH. *Books as Teaching Machines: Some Data*. Paper presented at Midwestern Psychological Association, Chicago, Illinois. Murray Hill, N.J.: Bell Telephone Laboratories, May 1961. 6 p. (Offset)

- HUGHES, JOHN L. *The Effectiveness of Programmed Instruction: Experimental Findings for 7070 Training*. New York: International Business Machines Corporation, January 1961. 12 p. (Offset) (a)
- HUGHES, JOHN L. *Programmed Instruction: A Follow-Up Study of 7070 Training*. New York: International Business Machines Corporation, October 1961. 23 p. (Offset) (b)
- HYER, ANNA L., editor. "Self-Instructional Devices." *Audio-Visual Instruction* 8: 126-84; April 1961.
- IRION, ARTHUR L., and BRIGGS, LESLIE J. *Learning Task and Mode of Operation Variables in Use of the Subject Matter Trainer*. Technical Report AFPTRC-TR-57-8. Lowry Air Force Base, Colo.: Air Force Personnel and Training Research Center, October 1957. 19 p.
- ISRAEL, MATTHEW L. "Variably Blurred Prompting: I. Methodology and Application to the Analysis of Paired-Associate Learning." *Journal of Psychology* 50: 43-52; 1960.
- KAESS, WALTER, and ZEAMAN, DAVID. "Positive and Negative Knowledge of Results on a Pressey-Type Punchboard." *Journal of Experimental Psychology* 60: 12-17; July 1960.
- KEISLAR, EVAN R. "The Development of Understanding in Arithmetic by a Teaching Machine." *Journal of Educational Psychology* 50: 247-53; December 1959.
- KEISLAR, EVAN R., and MCNEIL, JOHN D. "A Comparison of Two Response Modes in an Auto-Instructional Program with Children in the Primary Grades." (Abstract) *American Psychologist* 16: 369; July 1961.
- KLAUS, DAVID J., and LUMSDAINE, ARTHUR A. *An Experimental Field Test of the Value of Self-Tutoring Materials in High School Physics. An Interim Report of Progress and Findings*. Pittsburgh: American Institute for Research, April 1960. 18 p. (Mimeo.)
- KOPSTEIN, FELIX F., and ROSHAL, SOL M. "Methods of Presenting Word Pairs as a Factor in Foreign Vocabulary Learning." (Abstract) *American Psychologist* 10: 354; August 1955.
- KOPSTEIN, FELIX F., and SHILLESTEAD, ISABEL. *A Survey of Auto-Instructional Devices*. Project No. 1710; Task No. 171007. Wright-Patterson Air Force Base, Ohio: Aero-Space Medical Laboratory, September 1961. 109 p. (Offset)
- KORMONDY, E. J. "Oberlin Experiment in Self-Instruction in General Zoology: Preliminary Analyses." Cited in *Automated Teaching: A Review of Theory and Research*. (Robert E. Silverman.) Technical Report NAVTRADEVEN 507-2. Port Washington, N.Y.: U.S. Naval Training Device Center, June 1960. p. 17. (Offset)
- KRUMBOLTZ, JOHN D., and WEISMAN, RONALD G. *The Effect of Overt vs. Covert Responding to Programmed Instruction on Immediate and Delayed Retention*. East Lansing: Michigan State University, 1961. 9 p. (Mimeo.)
- LEVIN, GERALD R. *Principles of Programming Material for Teaching Machines and Their Relation to Transfer of Training*. Final Report, U.S. Office of Education Grant No. 7-37-088.00. Providence, R.I.: Brown University, June 1961. 2 p. (Mimeo.)
- LEWIS, EARL N. *Experimentation in the Development of More Effective Methods of Teaching Foreign Languages by Making Extensive Use of Electromechanical Aids*. U.S. Office of Education Grant SAE-8715. Baton Rouge: Department of Foreign Languages, Louisiana State University, July 1961. 19 p.
- LUMSDAINE, ARTHUR A., editor. "Instructional Media." *Contemporary Psychology*, monthly, American Psychological Association, Washington, D.C., beginning December 1960.
- LUMSDAINE, ARTHUR A., editor. "Teaching Machines and Auto-Instructional Programs." *AV Communication Review*, quarterly, Department of Audiovisual Instruction, National Education Association, Washington, D.C., beginning March-April, 1961.
- LUMSDAINE, ARTHUR A., and GLASER, ROBERT, editors. *Teaching Machines and Programmed Learning: A Source Book*. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. 724 p.
- MAGER, ROBERT F. "Preliminary Studies in Automated Teaching." *IRE Transactions on Education* E-2: 104-107; June 1959.
- MAGER, ROBERT F. *On the Sequencing of Instructional Content*. Palo Alto, Calif.: Varian Associates, 1961. 13 p. (Offset)
- MARKLE, SUSAN M.; EIGEN, LEWIS D.; and KOMOSKI, P. KENNETH. *A Programmed Primer on Programming*. New York: Center for Programed Instruction (365 West End Avenue), 1961. 25 p.

- MEIERHENRY, WESLEY C., editor. "Learning Theory and AV Utilization." *AV Communication Review*. Vol. 9, Supplement No. 4. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, September-October 1961. 88 p.
- MELARAGNO, RALPH J. "Effect of Negative Reinforcement in an Automated Teaching Setting." *Psychological Reports* 7: 381-84; October 1960.
- MEYER, SUSAN R. "Report on the Initial Test of a Junior High-School Vocabulary Program." *Teaching Machines and Programmed Learning: A Source Book*. (Edited by Arthur A. Lumsdaine and Robert Glaser.) Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1960. p. 229-46.
- MOON, HAROLD, editor. *AID: Auto-Instructional Devices for Education and Training*, Institute of International Research and Development, Lubbock, Texas, beginning April 1961.
- MORRILL, CHARLES S. "Teaching Machines: A Review." *Psychological Bulletin* 58: 363-75; September 1961.
- OAKES, WILLIAM F. "Use of Teaching Machines as a Study Aid in an Introductory Psychology Course." *Psychological Reports* 7: 297-303; October 1960.
- POPP, HELEN, and PORTER, DOUGLAS. "Programming Verbal Skills for Primary Grades." *AV Communication Review* 8: 165-75; July-August 1960.
- PORTER, DOUGLAS. "Some Effects of Year-Long Teaching Machine Instruction." *Automatic Teaching: The State of the Art*. (Edited by Eugene Galanter.) New York: John Wiley & Sons, 1959. Chapter 7, p. 85-90.
- ROE, ARNOLD, and OTHERS. *Automated Teaching Methods Using Linear Programs*. Report No. 60-105. Los Angeles: Department of Engineering, University of California, December 1960. 57 p. (Offset)
- ROE, KIKI V.; CASE, HARRY W.; and ROE, ARNOLD. *Scrambled vs. Ordered Sequence in Auto-Instructional Programs*. *Teaching Systems Research*. Project Report No. 61-48. Los Angeles: Department of Engineering, University of California, August 1961. 10 p. (Offset)
- ROTHKOPF, E. Z. "Automated Teaching Devices and a Comparison of Two Variations of the Method of Adjusted Learning." *Psychological Reports* 8: 163-69; September 1961.
- SHAY, CARLETON B. "Relationship of Intelligence to Step Size on a Teaching Machine Program." *Journal of Educational Psychology* 52: 98-103; February 1961.
- SHETTEL, HARRIS H., and LINDLEY, RICHARD H. *An Experimental Comparison of Two Types of Self-Instructional Programs for a SAGE System Paired-Associate Task*. AIR-C11-61-TR-251. Pittsburgh: American Institute for Research, March 1961. 21 p. (Mimeo.)
- SIDOWSKI, JOSEPH B.; KOPSTEIN, FELIX F.; and SHILLESTEAD, ISABEL J. "Prompting and Confirmation Variables in Verbal Learning." *Psychological Reports* 8: 401-406; June 1961.
- SILBERMAN, HARRY F.; MELARAGNO, RALPH J.; and COULSON, JOHN E. "Confirmation and Prompting with Connected Discourse Material." *Psychological Reports* 9: 235-38; October 1961.
- SILBERMAN, HARRY F., and OTHERS. "Fixed Sequence vs. Branching Auto Instructional Methods." *Journal of Educational Psychology* 52: 166-72; June 1961.
- SILBERMAN, ROBERT E. *Automated Teaching: A Review of Theory and Research*. Technical Report NAVTRADEVCEV 507-2. Port Washington, N.Y.: U.S. Naval Training Device Center, June 1960. 47 p. (a)
- SILBERMAN, ROBERT E. *The Use of Context Cues in Teaching Machines*. Technical Report NAVTRADEVCEV 507-1. Port Washington, N.Y.: U.S. Naval Training Device Center, March 1960. 13 p. (Offset) (b)
- SILBERMAN, ROBERT E., and ALTER, MILLICENT. "Note on the Response in Teaching Machine Programs." *Psychological Reports* 7: 496; December 1960.
- SILBERMAN, ROBERT E., and ALTER, MILLICENT. *Response Mode, Pacing and Motivational Experiments in Teaching Machines*. Technical Report NAVTRADEVCEV 507-3. Port Washington, N.Y.: U.S. Naval Training Device Center, June 1961. 69 p. (Offset)
- SKINNER, BURRHUS F. "Teaching Machines." *Science* 128: 969-77; October 24, 1958.
- SMITH, EDGAR A., and QUACKENBUSH, JACK. "Devereux Teaching Aids Employed in Presenting Elementary Mathematics in a Special Education Setting." *Psychological Reports* 7: 333-36; October 1960.

- SMITH, WENDELL, and MOORE, J. WILLIAM. *Size-of-Step and Achievement in Programmed Spelling*. U.S. Office of Education Report, Grant No. 7-36-087.00. Lewisburg, Pa.: Bucknell University, September 1961. 16 p.
- STOLUROW, LAWRENCE M. *A Comparative Study of Methods of Programming Materials for Efficient Learning in Self-Instructional Devices*. Cooperative Research Project No. HEW 661, SAE 8370. Urbana: University of Illinois, June 1961. 14 p. (Mimeo.) (a)
- STOLUROW, LAWRENCE M. *Teaching by Machine*. U.S. Department of Health, Education, and Welfare, Office of Education, Cooperative Research Monograph No. 6. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1961. 173 p. (b)
- TABER, JULIAN I., and GLASER, ROBERT. *An Exploratory Evaluation of a Discriminative Transfer Learning Program Using Literal Prompts*. U.S. Office of Education, Cooperative Research Program Project No. 691 (9417). Pittsburgh: University of Pittsburgh, March 1961. 16 p.
- TEACHING MACHINES INCORPORATED-GROLIER. *The Principles of Programed Learning*. Albuquerque, N.Mex.: Teaching Machines Incorporated, 1961. 13 p.
- WEITZ, JOSEPH. "Criteria for Criteria." *American Psychologist* 16: 228-32; May 1961.
- WENDT, PAUL R. *Preliminary Report on Research Grant NDEA Title VII, Part A*. Carbondale: Southern Illinois University, June 1961. 4 p. (Typewritten)
- ZUCKERMAN, CARL B.; MARSHALL, GEORGE R.; and GROESBERG, SANFORD. *Research in the Automation of Teaching*. NAVTRADEVCE 666-1. Port Washington, N.Y.: U.S. Naval Training Device Center, February 1961. 160 p. (Offset)

CHAPTER VII

Administration of Instructional Materials

JAMES W. BROWN and JOHN A. MOLDSTAD

THREE PREVIOUSLY published reviews of research by Allen and Malter (1954), Allen (1956), and Allen (1960a) relating to the administration of audiovisual instructional materials have been considered in developing the summaries which are to follow. The studies and authoritative papers which are reported here and which bring these articles up to date have been organized into the following categories: (a) school trends and instructional materials, (b) professionalization studies, (c) national evaluative criteria, (d) dissemination studies, (e) county and state audiovisual-instructional-materials programs, (f) school and school-system programs, (g) college and university programs, and (h) physical-facilities and equipment studies.

School Trends and Instructional Materials

Stoddard's (1957) predictive blueprint for "schools of tomorrow" proposed a challenging plan to meet several pressing school problems: impending teacher shortages; rapidly increasing enrollments; and increase in the amount, and a change in the nature, of what is to be learned; and serious financial shortages. Included with his proposals were reports of experiments in the following areas: variations in pupil grouping, increased teacher supply through the retraining of liberal arts graduates, utilization of noncertificated teachers' aides, improved planning and redevelopment of physical space and facilities for instruction, and television. As described in two publications by Trump (1960) and by Trump and Baynham (1961), the National Association of Secondary-School Principals, through its Commission on the Experimental Study of the Utilization of the Staff in the Secondary School, also called for new uses of instructional media, more-flexible class schedules, functional variations in class size according to instructional purpose and method, and more varied learning activities—in classrooms, in laboratories, or independently.

The Educational Policies Commission within the National Education Association (1958) recognized the validity of such recommendations by acknowledging that mass communication has given the teacher a new kind of student, new tools, and new responsibilities. It called upon administrators to facilitate flexible scheduling, to provide adequate instructional facilities and resources, to select "communication conscious" and skillful teachers, and to stimulate staff in-service education in uses of new media.

Miller and others (1957) summarized the findings of two Yale conferences of experts who sought to analyze ways of overcoming barriers to optimum use of graphic-communication materials in education. Recommendations were made that (a) audiovisual-production units in schools and colleges be properly staffed and supported, (b) information and cataloging services be enlarged and improved, (c) administrative provisions be put into effect to allow teachers to become personally acquainted with superior materials, (d) packaged, pretested source units be developed, and (e) there be some consolidation of several separate audiovisual agencies into a single comprehensive national audiovisual center. The report also considered problems of motivating administrators to set a needed tone for improved instruction through the use of new media.

Finn (1960) recently highlighted these and other similar opportunities in predicting the spread of two major audiovisual developments in schools of the future: (a) *mass* instructional technology, as illustrated by educational television, and (b) a technology for *individual* instruction, stimulated by the introduction of various automated self-teaching devices. He suggested that an expected outgrowth of these two developments would be the need to provide administratively for the force of greater organization. At each point, technology is applied to instruction—whether through interstate airborne television, teaching machine programming, or the system production, distribution, and utilization of integrated sets of instructional materials.

A symposium held at Stanford University (1960) under the sponsorship of the National Defense Education Act (NDEA) arrived at the consensus that the *systems approach* to education was the most practical means of avoiding overemphasis upon any one medium of instruction and of insuring the orderly consideration of functions and resources, including the ordered sequence of events leading to the accomplishment of specified and operationally defined achievements in instruction.

Another look toward the future potential of a systems approach was given by Bushnell and Cogswell (1961) in their review of recent research and developments in the field. The multiple implications of such developments for the administration of audiovisual-instructional-materials programs are evident—a computer-based library connected to a national library system, a student area where students in individual study cubicles instruct themselves with the aid of machine tutors linked via the school-system computer to a national information-retrieval system, which, in turn, processes written data into courses of study, develops diagnostic questions, and searches for answers to questions students ask.

Professionalization Studies

Several recent studies reflect a rising interest in the professionalization of audiovisual-communication specialists. Erickson (1959) established a bench mark in his writing of the first comprehensive textbook:

in the general area of administration of audiovisual-instructional-materials centers. Rugg's (1954) earlier study of the position of the audiovisual director in school systems in cities of 10,000 or more population revealed that, of 484 programs described on returns, only 66 were directed by full-time professionals. He concluded that in such cities (a) the appointment of full-time audiovisual directors gained momentum after World War II, (b) most audiovisual directors were formerly teachers, (c) colleges and universities should assume responsibility for the professional education of audiovisual directors, (d) most directors were administratively responsible to a superintendent or assistant superintendent of schools, and (e) the duties of the various directors were sufficiently alike to justify curriculum building for their professional education.

Ely's (1960) study of trends in curricula in higher education revealed that while at least 20 institutions used the "communication" label to denote an interdisciplinary approach to the study of mass media, there was little consistency in their patterns of administrative organization. Knapp (1960) solicited opinions from 60 national leaders and instructors in audiovisual education concerning the desirability of including communication-theory content in graduate audiovisual-education programs. Of the respondents, 96 percent believed it should be included at the master's level, while all considered it necessary at the doctoral level. Nearly two-thirds of the respondents indicated that they presently included some communications theory in their graduate programs. From a study of the opinions of 17 selected leaders in professional audiovisual education, Thomas (1960) concluded that there is a present shifting of emphasis from media themselves to the functions of those media in the curriculum, but that communication theory, as such, was not universally accepted as a rationale for the organization of audiovisual services.

Harclerod's (1960) report of the Department of Audio-Visual Instruction (DAVI) Seminar on the Education of the AV Communication Specialist emphasized the finding that the introduction of technological aids into school systems inevitably demands intensified organization and that the audiovisual specialist relates himself to such activities as a "change agent" or as a "learning technologist who is essentially an innovator." Another DAVI-sponsored seminar, reported by Campion (1960), examined the question: How has television changed the role of the audiovisual specialist? A new specialist—neither an audiovisual expert nor a TV producer, but a "supervisor of instructional resources" who coordinates the work of both—was proposed.

National Evaluative Criteria

Several sets of helpful evaluative criteria, developed cooperatively through the joint participation of audiovisual experts, librarians, and

school administrators, have come into use in recent years. Arising from the National Study of Secondary School Evaluation that was carried out in conjunction with the National Education Association and the American Council on Education (1960), the publication, *Evaluative Criteria: 1960 Edition*, for example, provides bases for measuring the effectiveness with which a school instructional-materials center (defined somewhat unclearly as a "school library and audiovisual department") is organized and administered. The criteria statement defined purposes of such centers as (a) providing a rich variety of instructional materials (defined as including books and other printed materials as well as the typically "audiovisual" materials) for individual and group use, (b) stimulating their proper utilization, (c) providing facilities, services, and equipment needed to select, organize, and use them, and (d) furnishing facilities and assistance to produce certain instructional materials and displays.

Two other evaluative-criteria check lists were developed by the Department of Audio-Visual Instruction of the National Education Association (1956, 1958)—the first, a general evaluation of audiovisual-instructional-materials services in secondary schools, and the second, a device for self-evaluation of audiovisual aspects of teacher-education institutions. The American Association of School Librarians (1960) reformulated a comprehensive set of qualitative and quantitative requirements to evaluate existing school-library programs and to guide future developments at elementary and secondary levels. The adequate-school library was again described as an "instructional-materials center"; it was reemphasized that one of its main objectives is to help children and young people to become skillful and discriminating users of both printed and audiovisual materials.

Dissemination Studies

Several studies cited needs for increasing and improving channels of information about educational media. Rufsvold and Guss (1961), for example, developed through an NDEA-financed project the most comprehensive cross-indexed listing of existing bibliographic tools and services for new media.

In a recent note cited in *Audio-Visual Instruction* (1960), the Educational Media Council, with joint membership of 12 national organizations, undertook the planning and publishing of a national directory of educational media. The first cross-media catalog of national scope, this directory will include physical data and content descriptions of all available educational materials, excepting textbooks and reference books. The New York State Audio-Visual Council (1961) used the questionnaire-interview-conference approach to carry out an NDEA-sponsored pilot project to ascertain suitable channels and methods of disseminating instructional materials and equipment to encourage their wider and more effective use in schools within New York State.

In studying the feasibility of establishing an "educational media research information service," Tauber and Lilley (1960) recognized another related and important administrative problem—the need to provide free and adequate flow of research information to practitioners in the field. Meierhenry and McBride's (1961) study of in-school telecast materials, which led to recommendations regarding the need for, and feasibility of, a national-distribution plan, highlighted a further trend in audiovisual administration: that new audiovisual resources often require new administrative patterns and procedures.

Cochern (1956), who studied questionnaire returns from 29 college and university film libraries to determine relative costs, utilization preference, and convenience of bound film catalogs and individual card catalogs, concluded that over a seven-year period, the costs of card catalogs would be prohibitive for large film libraries, similar for middle-sized libraries, and one-third cheaper for smaller libraries. In the sample tested, teachers showed preference for cards as opposed to catalogs. Sherman (1958), who studied the feasibility of using television to obtain teacher evaluations of instructional films, employed two teacher groups—one viewed films on TV screens in their own homes, and the other through regular projection. Results showed that (a) ratings of both groups were similar for black-and-white but not for color films and (b) no single criterion guaranteed that a film would be accepted or rejected. Of the participating teachers who viewed TV films, 91 percent indicated they believed that 10- to 15-minute films could be evaluated adequately in this manner.

Brown (1960) analyzed the cost of programming a film series by (a) broadcasting over open-circuit television, (b) broadcasting over closed-circuit television, and (c) in-class projection using locally owned and rented films. He found that (a) programming costs, which varied considerably, appeared to be a function of method utilized, (b) in-class programming of a film series cost more than programming nonseries films, (c) for in-class projection, school-owned films appeared to be the most economical method of programming a film series with small groups of schools—provided at least six schools used each set, (d) if fewer than six schools used one set, renting the series was most economical, (e) when the number of schools within a restricted area approached 30 to 40, televised programming should be considered, and (f) present methods of charging for TV rights appeared inadequate for present-day and future televising.

County and State Audiovisual-Instructional-Materials Programs

Various aspects of the administration of county and state audiovisual instruction programs were also examined, largely through status studies.

Described in *Audio-Visual Instruction* (1961), the State Audio-Visual Education Survey began its work in 1961 to determine how state departments of education function and exert leadership in the uses of new media. Repeating an earlier survey, deKieffer (1958) attempted to determine audiovisual activities of state departments in the education of teachers. In the 10-year period, 1947-57, certain changes were noted: (a) the number of states maintaining audiovisual divisions or offices increased from 13 to 23 of 48 states, (b) the number of their full-time employees increased, (c) the number of states with an audiovisual requirement for teacher certification increased from 2 to 4, and (d) in-service training activities of state departments increased slightly, but the number of audiovisual conferences or institutes offered decreased.

Through a survey sponsored jointly by the Department of Rural Education and the Department of Audio-Visual Instruction of the National Education Association, McCarty and Hartsell (1959) developed a series of principles applicable to the organization and administration of cooperative audiovisual programs. Data for their study were drawn from 104 such programs administered through county schools' intermediate units, independent county units, county unit districts, college and university cooperative centers, and certain miscellaneous units.

California showed unusual activity in investigating various aspects of state and county audiovisual-instructional-materials programs. Skelly (1956) studied the extent and costs of northern California county audiovisual services, inventories of materials and equipment, administrative service policies and procedures, personnel, and responsibilities of audiovisual administrators. He found that audiovisual budgets usually provided a \$1.50 minimum per unit of average daily attendance, or more for districts participating in the use of audiovisual materials. The average expenditure of funds per unit of average daily attendance for audiovisual services in all counties studied was \$1.49; the median was \$2.54.

Barnes (1960), who used tape-recorded informal interviews in studying the organization and administration of instructional-materials centers in medium-sized California school districts, presented her findings as hypotheses pertaining to the following aspects of effective operation: (a) procurement of materials, (b) organization of materials within the center, (c) dissemination of information to staff, (d) inventory operations, and (e) responsibilities of professional and noncertificated personnel in relation to objectives and functions of the center.

Hopkinson (1957) conducted a questionnaire and structured-interview status study of local California school districts that maintained formally organized programs for distributing and utilizing audiovisual materials. A preliminary canvass of approximately 2000 California school districts isolated 69 having their own audiovisual programs rather than programs which were part of county audiovisual systems. A total of 61 (of the 69) elementary-school, high-school, junior-college, and unified districts supplied detailed data to support conclusions that (a) the supply of ma-

terials in at least one-half of the districts, and equipment in most of the districts, was inadequate to meet normal needs, (b) selection and purchase of materials and equipment required evaluative participation of teachers and students and changes in procedures to permit purchases at times of greatest need, (c) standardized cataloging and library procedures for audiovisual materials were needed, (d) increased attention was required to improve the quality of classroom use of audiovisual materials and to contribute to curriculum planning, (e) more complete statistical records of audiovisual operation should be maintained to facilitate evaluation of services, (f) additional time should be allowed building coordinators, (g) additional space should be provided in schools to house audiovisual materials, and (h) additional room-darkening facilities should be provided.

Hass (1958) traced the development and legal bases of California county-level audiovisual service centers. He enlisted the help of 20 audiovisual experts—directors of audiovisual education in California counties of varying population densities—as a panel to evaluate the efficacy of criteria currently used by the California State Department of Education. His recommendations were that (a) state support be increased from \$1.50 per unit of average daily attendance to either \$4 per unit on a uniform state-wide basis or to an amount varying from \$3 per unit for counties of high population density to \$6 per unit for those with sparser population densities, (b) varying standards for allocations of materials and equipment (films and motion-picture projectors, for example) be justified by varying county population densities, (c) differing loan periods be justified for different kinds of instructional materials, and (d) different floor-space provisions be made for audiovisual services in counties with different population densities.

Pascoe (1959) studied the status of audiovisual education in California to determine the extent of agreement between college audiovisual educators and public-school administrators regarding desirable instructional emphases in audiovisual-education classes, based on the 1946 recommendations of the California State Department of Education. He concluded that (a) research substantiated the need for audiovisual-teacher education, (b) research with respect to audiovisual-teacher education was limited, (c) college instructors and public-school administrators closely agreed on the relative emphases of competencies which should be taught, (d) there was considerable variance in time required by various colleges to meet the state requirement of a course in audiovisual education (20-78 hours), (e) the 1946 audiovisual-competency statement appeared to contain no weaknesses, (f) several organizational patterns were found to exist in college audiovisual courses, and (g) laboratory experience was considered essential.

Allen's (1960b) survey of instructional-television potentialities and needs in California is somewhat typical of activities of state departments of education in seeking to determine desirable developmental patterns for state-wide programs. His 13 conclusions and recommendations laid

the groundwork for needed action in organized educational-TV activities at state, county, and school-district levels.

Schuller, Skelly, and Scott (1960) intensively surveyed the status and needs of audiovisual education in Hawaii. They recommended (a) appointment of a state director of audiovisual education, (b) establishment of district audiovisual centers, (c) improvement each year of light-control facilities in at least 20 percent of the classrooms, (d) strengthening of teacher education in newer media utilization, (e) increased financial support for audiovisual education (a range of \$1.80 per year per pupil in Oahu district to \$3 per pupil in Kauai district), and (f) development of a state-wide educational-TV network.

Adkins (1959) sought information in Texas about the availability of certain items of audio equipment, teacher preferences for radio broadcasts and tape recordings, and the difficulties of using classroom radio. His analysis of 1419 usable postcard returns from public-school teachers, grades 1-9, in Texas communities of more than 50,000 population, revealed that (a) 80 percent of the sample could be reached either by radio broadcasts or recordings of radio broadcasts, (b) the majority preferred recordings to actual radio for classroom use, (c) poor timing and lack of opportunity to preview or re-use were principal deterrents to direct use of radio, and (d) approximately 75 percent of all reported difficulties with radio related to the medium rather than the content or nature of programs.

School and School-System Programs

Rugg's (1960) case studies, part of an objective analysis of the audiovisual budgets of 28 selected school systems in the United States, led to conclusions that such budgets are (a) planned cooperatively as part of the total school-system budget, (b) financed principally from tax funds—generally regularly allocated and sometimes supplemented by bond funds used to purchase audiovisual equipment in new buildings and audiovisual centers, and (c) sometimes given extra financial support from the state.

Faris (1959) used the interview-questionnaire-expert-jury method to appraise the values of audiovisual student-assistant activities in selected Indiana schools in relation to the 10 "Imperative Needs of Youth," drawing judgments from 51 audiovisual coordinators, 51 secondary-school principals, 15 college professors from the field of communication, and 15 college professors in secondary education. He concluded that (a) such experiences contributed to salable skills, proper work habits, better use of leisure, improved communication skill, and other aspects of student development; (b) no one activity contributed more than any other in reaching goals of secondary education; (c) Indiana schools made only limited effort to employ qualified audiovisual coordinators; and (d) student-assistant activities were limited largely to equipment operation.

Kemp (1957) investigated the status of audiovisual-production activities in selected school systems in the United States, giving particular attention to administrative organization, purposes, personnel, physical facilities, equipment, types of production, financing, evaluation, and plans for future growth. In nine intensively studied school systems within the North Central Association, the principal purposes served by such production were found to be (a) public relations, (b) preparing instructional materials, and (c) meeting staff in-service training needs. The production of 2x2-inch slides was greater than that of other materials in all nine systems.

Schofield (1954) used historical and normative survey methods to evaluate the development and present status of the Newark, New Jersey, public-school audiovisual program. Areas of greatest strength were judged to be those of (a) the coordinated program of supplying teaching materials, (b) the breadth and democratic administration of the selection of materials, (c) teacher-training facilities, and (d) public relations.

Strohbehn (1955) analyzed the instructional-materials program of the Oak Ridge, Tennessee, schools to develop (a) a concept of the function of instructional materials in the educative process and (b) operational principles and evaluative criteria appropriate to the organization, administration, and appraisal of an instructional-materials program, with special application to the Oak Ridge system. He constructed a paradigm to emphasize elements affecting instructional programs and concluded that "good teaching" has its foundations in perspective that comes from a sensitiveness to interrelations of events (learning experiences), qualities (needs, motivations, abilities), properties (materials), and methods (teaching).

College and University Programs

An early investigation carried out by the Department of Audio-Visual Instruction of the National Education Association (1955) reported recommended aspects of college and university programs in audiovisual education and summarized case data from six institutions as guidelines for organizing and administering institutional audiovisual centers. Since that time, additional studies have examined specific details of programs in other institutions of higher learning. Larson (1957), for example, provided a detailed analysis of the long-term development of Indiana University's broadly integrated program of professional education, research, and on- and off-campus services between 1939 and 1956. In examining the costs of this institution's audiovisual center, Wiley (1956) concluded that throughout the same period, its film library and marketing operations were largely self-supporting, whereas its photographic, audio, and graphic-arts departments required subsidization.

Webster (1957) conducted a comprehensive interview and questionnaire survey of the current status of audiovisual services in 12 major state universities with reported 1957 enrollments above 15,000 and applied

personally developed criteria in a critical analysis of audiovisual services at the University of California at Los Angeles. His study gave attention to (a) administrative placement and organization of the audiovisual center, (b) activities and services performed, (c) number and responsibilities of staff members, (d) types and quantities of materials and equipment distributed, (e) budget and financial support, and (f) growth trends during the five-year period preceding 1957.

Hoyes (1960), who studied the organization and administration of audiovisual programs in 14 Pennsylvania state teachers colleges, concluded that each should be supplied a separate audiovisual budget, rental fees should be used to improve programs, and annual budgeting should take both sources of funds into account.

The Fund for the Advancement of Education's Committee on Utilization of College Teaching Resources (1959), in reporting results of teaching experiments in 49 colleges and universities, concluded that faculty and administration inertia accounts in large part for the slowness with which educational changes are accomplished and stressed that too little use was being made of new media and educational technology to aid in overcoming faculty shortages. One study by Laser and others (1961) led to a series of recommendations for using television in California state college educational programs, some of which bore directly on the need to meet such shortages.

Several other studies of reactions and deterrents to uses of new media in college instruction revealed similar findings. Macomber and others (1957) concluded that college instructors made inadequate use of audiovisual aids principally because they were not readily available. Hubbard (1960) used 315 returned check-list questionnaires and local-circulation data to determine deterrents to classroom use of audiovisual materials by the Syracuse University faculty. The most serious difficulties were found to be (a) lack of equipped classrooms, (b) problems of obtaining the right material when needed, (c) lack of budget to provide decentralization of certain materials and equipment, (d) unavailability of appropriate college-level materials, and (e) lack of information about sources.

Stepp (1960), who found a shortage of suitable communicative resources for teaching basic college freshman and sophomore courses, concluded that the two most common deterrents to the use of audiovisual materials at the college level were limited time of instructors for locating or designing appropriate materials and the lack of materials suitable to the aims of courses taught.

McIntyre's (1961) partially completed study of causes of resistance to use of audiovisual materials by university professors was accompanied by an evaluation of remediation procedures. Faculty attitudes toward the use of audiovisual materials were determined by the use of a Likert-type scale. Preliminary results showed a high degree of correlation between faculty rank and quantitative use of audiovisual materials, fewer deterrents to use with increased years of teaching experience, and agreement by 74 percent of the respondents that audiovisual aids were of potential value.

in large-class instruction. Principal deterrents, similar to those cited above, were (a) limited budgets, (b) lack of materials suitable for college instruction, (c) lack of technical assistance for preparation of materials, (d) lack of time for locating suitable materials, (e) inadequate showing facilities, and (f) unavailability of films, equipment, or operators when needed.

Physical-Facilities and Equipment Studies

Hyer's (1961) summary report of quantitative standards for personnel, materials, equipment, and service-space areas required in audiovisual coordination emphasized the general lack of agreement in these matters by experts in the field. Considerably more specific were the criteria standards for school libraries developed by the American Association of School Librarians (1960), which included minimal recommendations for reading rooms, listening and viewing areas, conference rooms, the library classroom, stacks, work and office areas, specialized library shelving and equipment, and audiovisual equipment.

Although no single experimentally tested set of standards has yet appeared for facilities and equipment required to adapt schools to uses of new educational media, several helpful reports are available. Cross and Cypher (1958), for example, brought together a third edition of a volume giving recommended standards for classroom space (including storage-space and work facilities); lighting, sound treatment, and air conditioning; wiring; provision of screens, projection stands, and built-in speakers; and receiving and distribution equipment for in-school television.

DeBernardis and others (1961) conducted a study of standards, sponsored by the U.S. Office of Education, to guide school-board members, school superintendents, and architects in planning school buildings to facilitate uses of new instructional media. They concluded that planning should be based on soundly conceived educational uses of media and that attention should be given to flexibility of designs because of constantly changing demands and opportunities for their use. They developed specific plans and criteria to guide the layout of instructional-materials centers, classrooms, language laboratories, auditoriums, multipurpose rooms, and radio and TV facilities.

The Southern Section of the Audio-Visual Education Association of California (1960) prepared an authoritative booklet on room-darkening standards and principles to serve as a guide for school administrators in planning classroom facilities for modern educational programs. The Association's Southern Section also sponsored three studies related to facilities aspects of audiovisual programs: (a) an abbreviated guide for elementary-school and secondary-school administrators as an aid to establishing and administering audiovisual-education programs (1961c) and

(b) separate sets of standards for minimal audiovisual equipment in elementary and secondary schools (1961a, b).

Two studies from the Educational Facilities Laboratory (1960, 1961) outlined details of functionally planned elementary and secondary schools. Several other studies have produced certain less generally applicable findings related to standards for facilities and equipment. Denno (1958), for example, determined experimentally the optimum-limit ranges of ambient light in classrooms for the satisfactory projection of 16mm films. Bowers (1956) used results of his nationwide opinion survey among audiovisual specialists, school administrators, curriculum experts, and architects to develop a check list of building facilities and audiovisual equipment considered essential for utilization of new media. The check list, in questionnaire form, was used with personnel in 275 elementary schools completed between 1945 and 1951. While he found that essential classroom facilities for new media were built into 62 percent of the architecturally outstanding schools studied, 45 percent of the schools were completely without any of the audiovisual machines regarded as necessary to the audiovisual program. Only 27 percent of the schools met the minimum standards for an adequate number of machines.

One of the few reported studies attempting to analyze data on conventional and TV costs of instruction was done by Seibert (1958). He found estimated costs of instructing fewer than four student sections by means of television as being higher than those for conventional instruction. An instructional-cost advantage for TV instruction was found possible when teaching 150 to 270 students, with higher-salaried instructors needing to teach fewer students than lesser-paid instructors to break even with conventional-instruction costs.

Godfrey (1961) reported preliminary findings from returns of 2800 school districts responding to a national survey questionnaire dealing with audiovisual media in public elementary and secondary schools. The first part of Godfrey's survey was directed toward discovering the availability in these districts of audiovisual materials which require special equipment to produce or project them. Future aspects of the study will seek to determine ways in which new media and related equipment are actually used in the schools.

Perhaps a forerunner of numerous studies to follow is White's (1961) analysis of problems of maintenance and operation of recently installed language laboratories in 29 California secondary schools.

Summary

Studies reviewed in this chapter appeared to be essentially descriptions and summaries of existing administrative functions, organizational patterns, and financial provisions; reports of criteria to evaluate existing programs; proposed programs for specific instructional-materials centers;

and studies of present or future curricula for the professional training of audiovisual-communication specialists. There is little evidence that these studies pave the way for other more significant research based on significant theoretical considerations in the administration of instructional-materials programs. But the pressure for more comprehensive and effective instructional-materials services leads inevitably to the need for controlled, experimental validation of many common administrative standards and procedures—in selection, weeding, distribution (including electronic techniques), improvement of utilization practices, local production, cataloging, and dissemination, as well as the selection and education of able administrators themselves.

Bibliography

- ADKINS, GALE R. *A Study of Certain Factors That Influence the Use of Radio Broadcasts and Recordings in Public School Classrooms*. Lawrence: Radio-Television Research, University of Kansas, 1959. 33 p.
- ALLEN, WILLIAM H. "Audio-Visual Materials." *Review of Educational Research* 26: 125-56; April 1956.
- ALLEN, WILLIAM H. "Audio-Visual Communication—Administration of AV Programs." *Encyclopedia of Educational Research*. Revised edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. p. 128-30. (a)
- ALLEN, WILLIAM H. *Television for California Schools*. Bulletin of the California State Department of Education, Vol. 39, No. 4. Sacramento, Calif.: the Department, April 1960. 48 p. (b)
- ALLEN, WILLIAM H., and MALTER, MORTON S. "Research Related to Audio-Visual Administration." *The School Administrator and His Audio-Visual Program*. (Edited by Charles F. Schuller.) 1954 Yearbook. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1954. p. 266-84.
- AMERICAN ASSOCIATION OF SCHOOL LIBRARIANS. *Standards for School Library Programs*. Chicago: American Library Association, 1960. 152 p.
- AUDIO-VISUAL EDUCATION ASSOCIATION OF CALIFORNIA (SOUTHERN SECTION). *Room Darkening for Audio-Visual Instruction*. Los Angeles: the Association (801 South Lorena Street), 1960. 14 p.
- AUDIO-VISUAL EDUCATION ASSOCIATION OF CALIFORNIA (SOUTHERN SECTION). "Audio-Visual Equipment Standards [Elementary Schools, K-6]." *Film World and A-V News Magazine* 17: 463-66; November 1961. (a)
- AUDIO-VISUAL EDUCATION ASSOCIATION OF CALIFORNIA (SOUTHERN SECTION). "Audio-Visual Equipment Standards [Junior and Senior High Schools]." *Film World and A-V News Magazine* 17: 514-15; December 1961. (b)
- AUDIO-VISUAL EDUCATION ASSOCIATION OF CALIFORNIA (SOUTHERN SECTION). *Your Audio-Visual Program: A Handbook for Principals*. Los Angeles: the Association (801 South Lorena Street), 1961. 16 p. (c)
- AUDIO-VISUAL INSTRUCTION. "Educational Media Council Launched: Starts Project." *Audio-Visual Instruction* 5: 217; September 1960.
- AUDIO-VISUAL INSTRUCTION. "SAVES Project To Undertake Long-Awaited Survey: Noel at Helm." *Audio-Visual Instruction* 6: 230-31; May 1961.
- BARNES, VIRGINIA C. *The Organization and Administration of the Instructional Materials Center in Medium-Sized School Districts*. Doctor's thesis. Stanford, Calif.: Stanford University, 1960. 247 p. Abstract: *Dissertation Abstracts* 21: 1104-1105; No. 5, 1960.
- BOWERS, KENNETH. *The Extent to Which Equipment and Facilities Essential to an Audio-Visual Program Have Been Provided in Elementary Schools Constructed Between 1945 and 1951, and Recommendations for Future Construction*. Doctor's thesis. New York: New York University, 1956. 589 p. Abstract: *Dissertation Abstracts* 16: 1854-55; No. 10, 1956.

- BROWN, ROBERT M. *Programming a Film Series: A Case Study Analysis of Factors Affecting the Cost of Selected Methods of Distributing Film Series*. Doctor's thesis. Bloomington: Indiana University, 1960. 216 p. Abstract: *Dissertation Abstracts* 21: 2168-69; No. 8, 1961.
- BUSHNELL, DON D., and COGSWELL, JOHN F. "A Computer-Based Laboratory for Automation in School Systems." *AV Communication Review* 9: 173-85; July-August 1961.
- CAMPION, LEE E. "AV-TV Seminar Summary." *Audio-Visual Instruction* 5: 234-46; October 1960.
- COCHERN, GEORGE W. *A Study of Production Costs and Certain Utilization Problems Involved in the Distribution of Sixteen Millimeter Film Information on File Cards as Compared with Bound Catalogs*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1956. 140 p. Abstract: *Dissertation Abstracts* 16: 2361; No. 12, 1956.
- CROSS, A. J., and CYPHER, IRENE. *Planning Schools for Use of Audio-Visual Materials: No. 1, Classrooms*. Third edition. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1958. 63 p.
- DEBERNARDIS, AMO, and OTHERS. *Planning Schools for New Media*. Portland, Ore.: Portland State College, 1961. 72 p.
- DEKIEFFER, ROBERT E. "AV Activities of State Departments in Teacher Education." *Audio-Visual Communication Review* 6: 292-300; Fall 1958.
- DENNO, RAYMOND E. "Classroom Screen Darkness Levels for Educational Film Projection." *Audio-Visual Communication Review* 6: 5-22; Winter 1958.
- EDUCATIONAL FACILITIES LABORATORY. *Design for Educational TV*. New York: the Laboratory (477 Madison Avenue), 1960. 96 p.
- EDUCATIONAL FACILITIES LABORATORY. *Schools for Team Teaching*. New York: the Laboratory (477 Madison Avenue), 1961. 64 p.
- ELY, DONALD P. "Communications Programs in Higher Education." *AV Communication Review* 8: 69-73; Winter 1960.
- ERICKSON, CARLETON W. H. *Administering Audio-Visual Services*. New York: Macmillan Co., 1959. 479 p.
- FARIS, KENNETH GENE. *An Appraisal by Indiana Educators of the Educational Value of Proposed Audio-Visual Student Assistant Activities*. Doctor's thesis. Bloomington: Indiana University, 1959. 307 p. Abstract: *Dissertation Abstracts* 20: 1284-85; No. 4, 1959.
- FINN, JAMES D. "Automation and Education: III. Technology and the Instructional Process." *AV Communication Review* 8: 5-26; Winter 1960.
- FUND FOR THE ADVANCEMENT OF EDUCATION, COMMITTEE ON UTILIZATION OF COLLEGE TEACHING RESOURCES. *Better Utilization of College Teaching Resources*. New York: the Fund, 1959. 63 p.
- GODFREY, ELEANOR P. "An Audiovisual Inventory of Public Schools." *Audio-Visual Instruction* 6: 518-19; December 1961.
- HARCLEROAD, FRED F., editor. "The Education of the A-V Communication Specialist." *AV Communication Review*. Vol. 8, Supplement No. 2. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, September-October 1960. 96 p.
- HAAS, CLAUDE W. *An Investigation of Criteria for the Evaluation of Audio-Visual Services Provided at the County Level in California*. Master's thesis. Stockton, Calif.: College of the Pacific, 1958. 161 p.
- HOPKINSON, SHIRLEY L. *Audio-Visual Programs in California Public School Districts*. Doctor's thesis. Norman: University of Oklahoma, 1957. 221 p. Abstract: *Dissertation Abstracts* 17: 1936; No. 9, 1957.
- HOYES, JACK F. *The Organization and the Administration of Audio-Visual Programs in the State Teachers Colleges of Pennsylvania*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1960. 154 p. Abstract: *Dissertation Abstracts* 21: 552-53; No. 3, 1960.
- HUBBARD, RICHARD D. *A Study of the Reasons Given for the Limited Use of Certain Audio-Visual Materials at Syracuse University*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1960. 229 p. Abstract: *Dissertation Abstracts* 21: 321; No. 2, 1960.
- HYER, ANNA L. "Setting Quantitative Standards." *Audio-Visual Instruction* 6: 506-10; December 1961.
- KEMP, JERROLD E. "AV Production Activities in School Systems." *Audio-Visual Communication Review* 5: 381-86; Winter 1957.

- KNAPP, AUSTIN C. *An Analysis of Trends in Selected Graduate Audio-Visual Education Programs*. Doctor's thesis. Bloomington: Indiana University, 1960. 136 p. Abstract: *Dissertation Abstracts* 21: 2631; No. 9, 1961.
- LARSON, L. C. "Developing an Integrated College Audio-Visual Program." *Phi Delta Kappan* 38: 211-21; February 1957.
- LASER, MARVIN, and OTHERS. *Television for the California State Colleges*. (Tentative edition.) Los Angeles: Trustees of the California State Colleges, September 1961. 159 p. (Offset)
- MCCARTY, HENRY R., and HARTSELL, HORACE C. *The Cooperative Approach to Audio-Visual Programs*. Washington, D.C.: Department of Audio-Visual Instruction and Department of Rural Education, National Education Association, 1959. 80 p.
- MCINTYRE, KENNETH M. *A Study To Determine Specific Sources of Resistance to the Use of Audio-Visual Materials by College and University Teachers and the Development of Procedures for Overcoming Barriers to Optimum Use*. (Unpublished preliminary statement.) Chapel Hill: University of North Carolina, 1961. 3 p.
- MACOMBER, F. G., and OTHERS. *Experimental Study in Instructional Procedures*, Report No. 2. Oxford, Ohio: Miami University, 1957. 65 p.
- MEIERHENRY, WESLEY C., and MCBRIDE, JACK. *Final Report of the Study of the Use of In-School Telecast Materials Leading to Recommendations as to Their Distribution and Exchange*. Lincoln: University of Nebraska, 1961. 137 p.
- MILLER, NEAL E., and OTHERS. "Graphic Communication and the Crisis in Education." *Audio-Visual Communication Review*. Vol. 5, Supplement No. 3. Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1957. 120 p.
- NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF AUDIO-VISUAL INSTRUCTION. *Planning Schools for Use of Audio-Visual Materials*, No. 4: *Audio-Visual Centers in Colleges and Universities*. Washington, D.C.: the Department, 1955. 140 p.
- NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF AUDIO-VISUAL INSTRUCTION. *Evaluative Criteria for AV Instructional Materials Service*. Washington, D.C.: the Department, 1956. 12 p.
- NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF AUDIO-VISUAL INSTRUCTION. *Audio-Visual Checklist for Self-Evaluating Teacher Education Institutions*. Washington, D.C.: the Department, 1958. 16 p.
- NATIONAL EDUCATION ASSOCIATION, EDUCATIONAL POLICIES COMMISSION. *Mass Communication and Education*. Washington, D.C.: the Commission, 1958. 137 p.
- NATIONAL EDUCATION ASSOCIATION and AMERICAN COUNCIL ON EDUCATION. *Evaluative Criteria: 1960 Edition*. National Study of Secondary School Evaluation. Washington, D.C.: the Association, 1960. 376 p.
- NEW YORK STATE AUDIO-VISUAL COUNCIL. *A Project To Improve the Dissemination of Information About New Instructional Media and Their Use in the Schools Within a State*. Syracuse, N.Y.: the Council, Syracuse University, 1961. 94 p.
- PASCOE, DAVID D., JR. *An Analytical Study of Audio-Visual Teacher Education in California*. Doctor's thesis. Los Angeles: University of California at Los Angeles, 1959. 162 p.
- RUFVOLD, MARGARET I., and GUSS, CAROLYN. *Guides to Newer Educational Media*. Chicago: American Library Association, 1961. 74 p.
- RUGG, KENNETH C. *An Analytical Study of the Position of the City School System Audio-Visual Director*. Doctor's thesis. Bloomington: Indiana University, 1954. 393 p. Abstract: *Dissertation Abstracts* 15: 757; No. 5, 1955.
- RUGG, KENNETH C. *Improving Instruction: Budgeting Your Audio-Visual Program*. Bloomington: Audio-Visual Center, Indiana University, 1960. 90 p.
- SCHOFIELD, EDWARD T. *An Evaluation of the Audio-Visual Program in the Public Schools of Newark, New Jersey*. Doctor's thesis. New York: New York University, 1954. 278 p. Abstract: *Dissertation Abstracts* 15: 210-11; No. 2, 1955.
- SCHULLER, CHARLES F.; SKELLY, HARRY J.; and SCOTT, DONALD. *Survey of Audio-Visual Education in Hawaii: Its Status and Needs*. U.S. Department of Health, Education, and Welfare, Office of Education. Washington, D.C.: Superintendent of Documents, Government Printing Office, 1960. 60 p.
- SEIBERT, WARREN F. *Cost Estimates and Comparisons for Televised and Conventional Instruction*. TVPR Report No. 7. Lafayette, Ind.: Audio-Visual Center, Purdue University, 1958. 14 p.
- SHERMAN, MENDEL. "Evaluating Instructional Films by Television." *Audio-Visual Communication Review* 6: 109-15; Spring 1958.

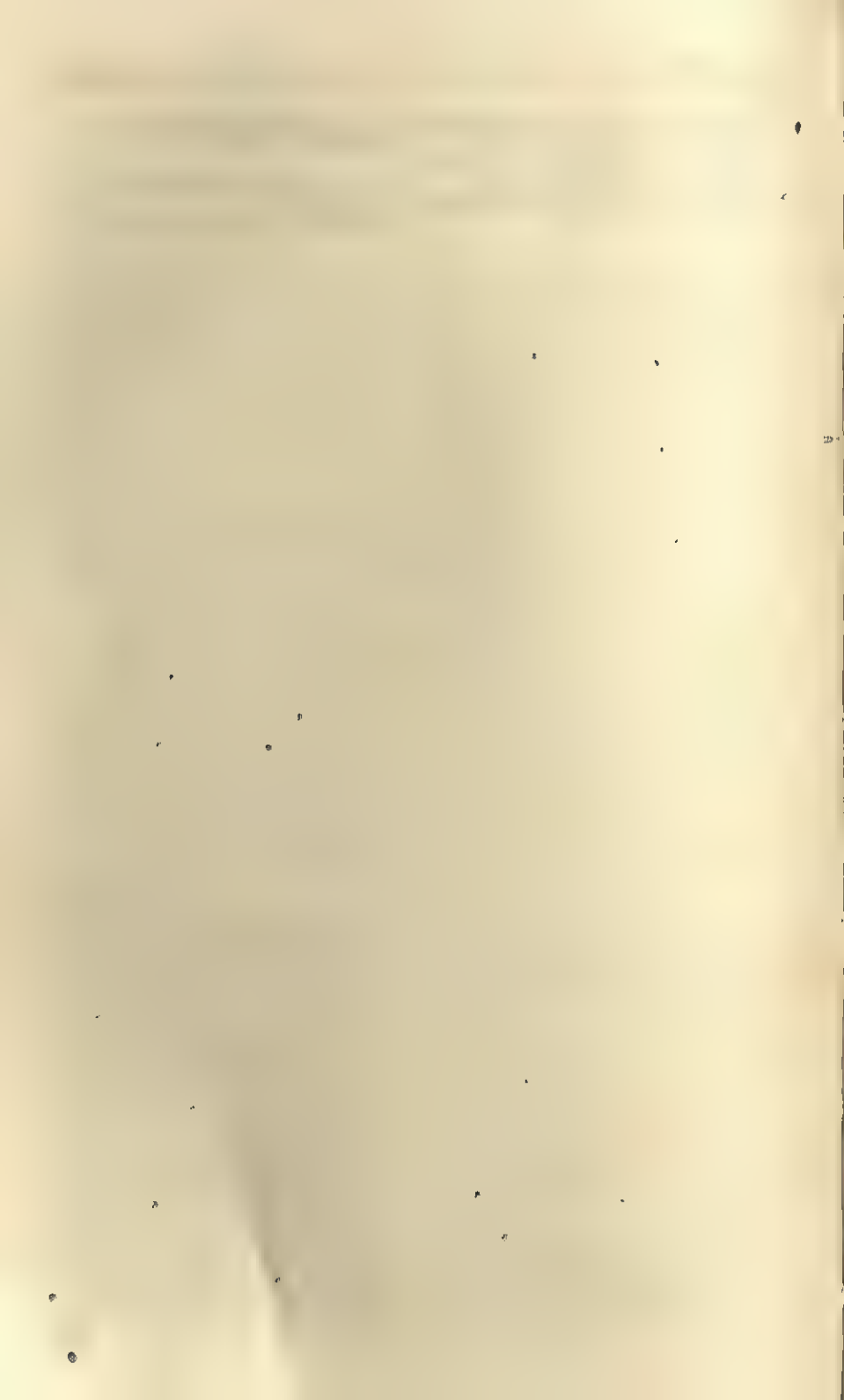
- SKELLY, HARRY J. *Audio-Visual Services in Counties of Northern California*. Doctor's thesis. Stanford, Calif.: Stanford University, 1956. 174 p. Abstract: *Dissertation Abstracts* 16: 1826-27; No. 7, 1956.
- STANFORD UNIVERSITY, INSTITUTE FOR COMMUNICATION RESEARCH. *New Teaching Aids for the American Classroom*. Stanford, Calif.: the University, 1960. 173 p.
- STEPP, ROBERT E. *A Study of Instructional Communicative Resources Employed in Selected Basic-Education Courses Offered at Institutions of Higher Education*. Doctor's thesis. Lincoln: University of Nebraska, 1960. 420 p. Abstract: *Dissertation Abstracts* 21: 1877; No. 7, 1961.
- STODDARD, ALEXANDER J. *Schools for Tomorrow: An Educator's Blueprint*. New York: Fund for Advancement of Education, 1957. 62 p.
- STROHBEHN, EARL F. *A Study of the Instructional Materials Program in the Oak Ridge (Tennessee) Public Schools: Conception, Organization, Administration, Management, and Utilization*. Doctor's thesis. Knoxville: University of Tennessee, 1955. 340 p.
- TAUBER, MAURICE F., and LILLEY, OLIVER L. *Feasibility Study Regarding the Establishment of an Educational Media Research Information Service*. New York: School of Library Service, Columbia University, 1960. 235 p.
- THOMAS, FRANCES A. *Philosophies of Audio-Visual Education as Conceived in a University Center and by Selected Leaders*. Doctor's thesis. Bloomington: Indiana University, 1960. 212 p. Abstract: *Dissertation Abstracts* 21: 2639; No. 9, 1961.
- TRUMP, J. LLOYD. *New Directions to Quality Education; the Secondary School Tomorrow*. Washington, D.C.: National Association of Secondary-School Principals, National Education Association, 1960. 14 p.
- TRUMP, J. LLOYD, and BAYNHAM, DORSEY. *Focus on Change: Guide to Better Schools*. Chicago: Rand McNally and Co., 1961. 147 p.
- WEBSTER, HOWARD BISSELL. *A Critical Study of Administrative Practices and Procedures of Audio-Visual Centers in Major State Universities*. Doctor's thesis. Los Angeles: University of California at Los Angeles, 1957. 195 p.
- WHITE, LAWRENCE B. "Analysis of Problems of Maintenance and Operation of Language Laboratories in California High Schools." *California Schools* 32: 437-55; November 1961.
- WILEY, JOSEPH BARRON. *An Analysis of Services and Costs of a University Audio-Visual Center with an Integrated Program of Production, Materials, and Professional Education*. Doctor's thesis. Bloomington: Indiana University, 1956. 220 p. Abstract: *Dissertation Abstracts* 16: 2376-77; No. 12, 1956.

Index to Volume XXXII, No. 2

Page citations, though made to single pages, often indicate beginning of a chapter, section, or running discussion dealing with a topic.

- Administration of instructional materials: college and university programs, 202; county and state audiovisual-instructional-materials programs, 198; dissemination studies, 197; national evaluative criteria, 196; physical-facilities and equipment studies, 204; professionalization studies, 195; school trends, 194; school and school-system programs, 201
- Audiovisual communications: theoretical formulations, 119
- Audiovisual materials: utilization of, 150
- Audiovisual materials, effectiveness of: filmstrips, slides, and transparencies, 144; motion pictures, 141; pictorial illustration and graphic materials, 146; recordings and radio, 147; three-dimensional materials, 148
- Audiovisual theoretical concepts: cafeteria of materials, 120; concrete-to-abstract relationship, 120; major, 119; technical theory relating to equipment, 121
- Censorship: related to content analysis, 130
- Communication process: models of, 123
- Comparison of programmed instruction with conventional instruction: relative effectiveness of each approach, 185; trends and problems of methodology, 186
- Content analysis: censorship related to, 130; language arts, 128; mathematics and science, 129; social studies, 128
- Design of printed materials: discussion of, 132
- Filmstrips: effectiveness of, 144
- Finn's Law: discussion of, 122
- Graphic materials: effectiveness of, 146
- Illustration: in printed materials, 132
- Illustration, pictorial: effectiveness of, 146
- Instructional materials: administration of, 194; use of, in language laboratories, 169
- Instructional television: effectiveness of learning from, 156; questions suggested by studies of, 164; student attitudes toward, 160; teacher attitudes toward, 162
- Language arts: printed materials for, 128
- Language laboratory: equipment in, 172; history of, 168; instructional materials in, 169; rationale for equipment in, 171; as teaching machine, 174
- Learner characteristics: discussion of, 149
- Learning spaces: design of, 123
- Learning from television: effectiveness of, 156
- Mathematics and science: printed materials for, 129
- Motion pictures: effectiveness of, 141
- Paperback books: discussion of, 134
- Printed materials: design of, 132; illustration of, 132; paperback books, 134; trade books, 134; use of, 127, 133; workbooks, 134
- Program variables: adaptation of, to individual differences, 184; definition of response modes, 180; discussion of, 179; eliciting desired responses, 181
- Programmed instruction vs. conventional instruction: relative effectiveness of each approach, 185; trends and problems in methodology, 186
- Programmed materials: discussion of, 179
- Programmed textbooks: studies of, 132
- Radio: effectiveness of, 147
- Readability: studies of, 130
- Recordings: effectiveness of, 147
- Self-teaching devices: discussion of, 179
- Self-teaching devices and programmed materials: summaries and reviews of, 179
- Slides: effectiveness of, 144
- Social studies: printed materials for, 128
- Social trends: affecting audiovisual research, 119
- Systems approach: discussion of, 122
- Teacher: changing role of, 123
- Teaching: by electronic or mechanical means, 124
- Television, instructional: 156
- Textbooks: availability of, 127, 135
- Textual variables: illustration and design, 132; programmed textbooks, 132; readability, 130; typography, 131

- Theoretical concepts: (*see* audiovisual theoretical concepts)
- Theoretical formulations: 119 (*see also* audiovisual theoretical concepts)
- Three-dimensional materials: effectiveness of, 148
- Transparencies: effectiveness of, 144
- Typography: studies of, 131
- Use of materials: for individual and group learning, 121
- Utilization: of audiovisual materials, 150



REVIEW OF EDUCATIONAL RESEARCH

*Official Publication of the American Educational Research Association
Contents are listed in the Education Index.*

Copyright 1962

By National Education Association of the United States, Washington, D.C.

Volume XXXII, No. 3

June 1962

Educational Research in Countries Other than the United States

Reviews the literature for the five-year period
since the issuance of Vol. XXVII, No. 1, February 1957.

TABLE OF CONTENTS

Chapter	Page
Foreword	216
I. Australia and New Zealand	217
Australia	217
WILLIAM C. RADFORD, <i>Australian Council for Educational Research, Melbourne, Australia</i>	
New Zealand	225
GEORGE W. PARKYN, <i>New Zealand Council for Educational Research, Wellington, New Zealand</i>	
II. Canada	234
ROBERT W. B. JACKSON, <i>Ontario College of Education, University of Toronto, Ontario, Canada</i>	
WILLARD BREHAUT, <i>Ontario College of Education, University of Toronto, Ontario, Canada</i>	
III. Latin American Countries: Chile, Peru, and Puerto Rico	247
An Overview of Educational Research in Latin America	247
PABLO ROCA, <i>Division of Education, Pan American Union, Washing- ton, D.C.</i>	
Chile	250
ECIDIO ORELLANA, <i>Institute of Statistical Research, University of Chile, Santiago, Chile</i>	
Peru	255
MODESTO RODRÍGUEZ MONTÓYA, <i>Ministry of Education, Lima, Peru</i>	
Puerto Rico	261
MIGUELINA N. HERNÁNDEZ, <i>Department of Education, San Juan, Puerto Rico</i>	

<i>Chapter</i>	<i>Page</i>
IV. Japan	265
ARATA YODA, <i>University of Tokyo, Tokyo, Japan</i>	
TADASHI HIDANO, <i>University of Tokyo, Tokyo, Japan</i>	
V. Israel	280
MOSHE SMILANSKY, <i>Henrietta Szold Institute, Jerusalem, Israel</i>	
VI. East Africa	293
P. G. WINGARD, <i>Makerere University College, Kampala, Uganda</i>	
VII. French-Speaking Countries: Belgium, France, and Switzerland	298
FERNAND HOTYAT, <i>Higher Educational Institute, Hainaut, Morlanwelz, Belgium</i>	
GASTON MIALARET, <i>University of Caen, Caen, France</i>	
VIII. West Germany	308
LUDWIG VON FRIEDEBERG, <i>Institute for Social Research, Frankfurt, West Germany</i>	
IX. Scandinavian Countries: Finland and Sweden	320
Finland	320
MARTTI TAKALA, <i>Center for Educational Research, University of Jyväskylä, Jyväskylä, Finland</i>	
Sweden	327
TORSTEN HUSÉN, <i>Institute of Educational Research, University of Stockholm, Stockholm, Sweden</i>	
NILS-ERIC SVENSSON, <i>Institute of Educational Research, University of Stockholm, Stockholm, Sweden</i>	
X. Yugoslavia	332
VLADIMIR MUŽIĆ, <i>Institute of Education, University of Zagreb, Zagreb, Yugoslavia</i>	
XI. Poland	344
JAN KONOPNICKI, <i>Wrocław, Poland</i>	
XII. Spain	347
VICTOR GARCIA HOZ, <i>University of Madrid, Madrid, Spain</i>	
XIII. The United Kingdom	354
W. D. WALL, <i>National Foundation for Educational Research in England and Wales, London, England</i>	
K. M. MILLER, <i>National Foundation for Educational Research in England and Wales, London, England</i>	
Index	361

This issue of the REVIEW was sponsored by the Committee on
International Relations and was prepared
by a special committee consisting of the following members:

ROY M. HALL, *Chairman*, School of Education, University of Delaware, Newark,
Delaware
DAVID L. CLARK, Ohio State University, Columbus, Ohio
HOWARD F. HJELM, Division of Education, Pan American Union, Washington, D.C.
DAVID R. KRATHWOHL, Bureau of Educational Research, Michigan State University,
East Lansing, Michigan
JAMES V. MITCHELL, JR., University of Texas, Austin, Texas
BEEMAN N. PHILLIPS, University of Texas, Austin, Texas
PABLO ROCA, Division of Education, Pan American Union, Washington, D.C.
GERALD R. SMITH, Cooperative Research Program, U.S. Office of Education, Washing-
ton, D.C.

with the assistance of

WILLARD BREHAUT, Ontario College of Education, University of Toronto, Ontario,
Canada
MIGUELINA N. HERNANDEZ, Department of Education, San Juan, Puerto Rico
TADASHI HIDANO, University of Tokyo, Tokyo, Japan
FERNAND HOTYAT, Higher Educational Institute, Hainaut, Morlanwelz, Belgium
VICTOR GARCIA HOZ, University of Madrid, Madrid, Spain
TORSTEN HUSÉN, Institute of Educational Research, University of Stockholm, Stock-
holm, Sweden
ROBERT W. B. JACKSON, Ontario College of Education, University of Toronto, Ontario,
Canada
JAN KONOPNICKI, Wrocław, Poland
GASTON MIALARET, University of Caen, Caen, France
K. M. MILLER, National Foundation for Educational Research in England and Wales,
London, England
MODESTO RODRÍGUEZ MONTOYA, Ministry of Education, Lima, Peru
VLADIMIR MUŽIĆ, Institute of Education, University of Zagreb, Zagreb, Yugoslavia
EGIDIO ORELLANA, Institute of Statistical Research, University of Chile, Santiago,
Chile
GEORGE W. PARKYN, New Zealand Council for Educational Research, Wellington,
New Zealand
WILLIAM C. RADFORD, Australian Council for Educational Research, Melbourne,
Australia
MOSHE SMILANSKY, Henrietta Szold Institute, Jerusalem, Israel
NILS-ERIC SVENSSON, Institute of Educational Research, University of Stockholm,
Stockholm, Sweden
MARTTI TAKALA, Center for Educational Research, University of Jyväskylä, Jyväskylä,
Finland
LUDWIG VON FRIEDEBERG, Institute for Social Research, Frankfurt, West Germany
W. D. WALL, National Foundation for Educational Research in England and Wales,
London, England
P. G. WINGARD, Makerere University College, Kampala, Uganda
ARATA YODA, University of Tokyo, Tokyo, Japan

FOREWORD

This issue of the REVIEW represents tremendous effort on the part of many individuals: the committee members who were responsible for the preparation of the issue, the writers who completed the manuscripts, and the members of the American Educational Research Association who went abroad on several occasions to talk with researchers in various countries.

With a recommendation of the committee on international relations and with the approval of the executive committee of the American Educational Research Association, this issue was intended to differ from previous issues in two respects. First, it was intended to represent the last issue devoted exclusively to research from other countries. Second, it was to contain not only a review of research from other countries but also a delineation of the major problems under investigation by those countries as well as of the research techniques being used in the investigations. The latter objective was not altogether accomplished. Consequently, the contributions vary in content and format. Those of us who had the opportunity to visit other countries and to talk with researchers there have been encouraged both by the extent to which researchers outside the United States are working on problems of great concern to us and by the progress that they are making in understanding several of these problems.

Finally, as chairman of the committee, but speaking for the committee as a whole, I feel that the next great step for the American Educational Research Association in the improvement and advancement of educational research is to bring researchers in the United States and researchers in other countries into a face-to-face working relationship. This can be accomplished only as we identify the concerns of educational researchers of other lands with our own. A large conference does not seem to facilitate this kind of relationship. The American Educational Research Association, therefore, is encouraged to find ways and means whereby educational researchers in this country and in other countries can be brought together in small groups to work on common problems by comparing techniques, findings, and implications. To some extent, this issue lays the groundwork for such an approach. However, it does not go far enough.

The chairman thanks all of those who have contributed both to the issue and to the accomplishment of these purposes.

ROY M. HALL, *Chairman*
Special Committee on
Educational Research in Countries
Other than the United States

CHAPTER I

Australia and New Zealand

*Australia—William C. Radford**

THERE HAS BEEN a noticeable increase since 1956 in published research in Australia. It is impossible to refer to all published materials, but those cited in the bibliography are representative of the work done. Although the studies reported in the following pages have been grouped, the grouping is somewhat arbitrary. No attempt has been made to cover historical studies, although there is an extensive body of research now available on aspects of the history of Australian education (e.g., Fogarty, 1959).

Preschool and Primary-Level Education

Scott (1959) confirmed the effectiveness of the nursery school in developing social values of self-reliance, cooperation, and compliance with social values. Harsanyi (1961) cast doubt on the view that aggression in preschool children may be a sign of low identification with adults in the home.

Danziger (1958) outlined stages passed through by children aged five to eight in arriving at concepts of economic relationship (such as rich *versus* poor, or boss *versus* worker), and in another study Danziger and Sharp (1958) used Piaget's interview methods to ascertain children's explanations of growth and movement.

School Subjects

Reading

Research in reading has covered a wide range of topics. One study by Richardson (1958b) was concerned with teaching by phonic analysis and its relation to backwardness. The results indicated that since many children between the ages of 8 and 10 years were unable to discriminate adequately between words of similar sound, emphasis upon phonic analysis would be quite inappropriate. A statewide survey of average standards conducted by the Queensland Department of Education (1960) compared the 1960 standards in various aspects of reading with those of 1946 and found that the two sets did not differ significantly. The value of carefully devised

* The main burden of the work of preparing this chapter has been borne by T. S. Duff and N. Buckman, without whose aid in preparing abstracts it would have been impossible to cover the considerable quantity of published material.

readiness programs for infants and for children in primary schools and of well-organized and individualized instruction in primary and secondary schools was well demonstrated in Western Australian schools by the Western Australia Department of Education (1959, 1960a, b).

After a carefully controlled period of trial and experiment, the Queensland Department of Education (1958a) introduced a new reading program for the first two years of schooling. Subsequently, the Department (1959a) reported highly successful results from an intensive remedial program in which careful efforts were made to secure the cooperation of both parents and teachers.

In a very thorough study, Richardson (1958a) examined the relation of physical factors to reading failure and concluded that whether a physical anomaly led to school failure and maladjustment depended upon home conditions.

Speech

The Queensland Department of Education (1959b) attempted to examine the separate effects of maturation and normal school efficiency on 119 children in grade 1 with speech defects. Without any special instruction many of the children showed decided improvement, but some sounds were more difficult to improve than others. Gunn (1960) made a preliminary analysis of the speech of students in a teachers college and found differences in accent between students related to sex, intelligence, home, and locality.

Spelling

Walker (1960) reported that improvement in spelling was generally independent of the difficulty of words taught, that only a small number of misspellings consisted of fixed errors, and that desire by the child to progress and to spell well was at least as important as an efficient teaching method.

The Queensland Department of Education (1958b) reported that state standards had not declined between 1935 and 1957 as a result of introducing spelling lists, that children were dealing in 1957 with words formerly expected of children a year older, and that changes in grade classification along with the tendency for all children to enter grade 8 (the last year of primary school) would inevitably lead to some decline in standards.

School Attainment

Surveys of attainment have been reported by the Queensland Department of Education (1958b, 1960). Schonell, Meddleton, and Watts (1960)

revealed that the level of school attainment of aboriginal children in Queensland was in general very low. They considered the social setting and found it generally impoverished and suggested a positive campaign to raise expectation and provide motives for social and educational achievement. Pidgeon (1958) reported an international comparison of performance in reading, nonverbal ability, and arithmetic. Compared with children in England and Wales, Queensland children were inferior in reading and nonverbal ability but superior in mechanical arithmetic.

Special Education

Cochrane (1960) analyzed the test results of 1039 children tested from 1952 to 1955 who had been nominated as probably in need of special schooling. He pointed to the need for care in deciding who should have special schooling and to the desirability for special courses, particularly at the secondary level, Schonell and others (1959) examined by careful interview and observation the burden imposed on parents by the presence of a subnormal child in the family and stressed the need for community help to such parents. Brown and Alleyne (1957) followed up the life achievements of a group of 95 educable subnormals (mean IQ, 63; age range, 25-40) and found them more competent than might otherwise be expected.

University Students and University Problems

A considerable volume of research work was undertaken on enrollments and on success and failure (and to a lesser degree on personality factors) of university students.

Although Borrie and Dedman (1957), Davis (1960), Murray (1957), and the Australian Universities Commission (1960) all reported different estimates of potential enrollments at Australian universities, they agreed that there would be a considerable increase over the next decade.

Sanders (1958) surveyed the available research on success and failure and pointed out the validity of the claim that in Australia about two-thirds to three-quarters of entering students finally were graduated and about one-half of those who were graduated did so in minimum time. Achievement examinations taken prior to entry predicted success better than intelligence or special aptitude tests, the correlation of the former with first-year success being about .6. The best predictor of eventual university success is first-year success.

Reasons for failure have been considered by Olsen (1957) and by the Commonwealth Office of Education (1959). It is evident that there is no easy solution. Inadequate preparation and insufficient ability play some part, but personal factors, study habits, motivation, and poor adjustment to the university also contribute.

Anderson (1960) examined aspects of the personality of students, finding differences between entering students from different kinds of schools. Meddleton (1960) drew attention to the difference in success rate at the University of Queensland between students whose school performance showed a tendency to improve and those whose school performance showed deterioration.

The Commonwealth Office of Education (1961) and Rorke (1959) reported findings concerning the occupation of graduates. Rorke was concerned with women graduates of the University of Queensland and drew attention to changes in the courses taken and occupations entered. The Commonwealth Office of Education pointed out that most graduates were in a professional occupation of some kind, that governments were the major employers, and that those whose occupation was housewife may be a possible source of recruitment to professions in need of assistance.

Analysis and Comment

During the past five years, attention has been given by research workers within universities to factors which are at least related to success and failure, although the nature of the relationship is often not clear. Among these factors are the nature and quality of the student's academic preparation. Clearer specification of the objectives of both pre-university and university teaching may yield better predictive indexes at pre-university levels, but they are not likely to be perfect when so many new factors affect performance levels at universities. Hence a great deal of research has been done by questionnaire, by structured interview, by testing, and by examination of clinical records to establish the conditions under which students work and live, the problems they have in adjusting to university life, and the improvements that might be made to enhance their chances of success. It has become generally accepted that many students can be helped through better guidance in study habits prior to entry to the university, through better guidance services within the university to help them choose appropriate courses and to meet their demands, and through a more personal approach to teaching than many large first-year classes make possible.

At the same time that the student and his approach to his work are receiving attention, some universities are giving consideration to means of improving the quality and type of teaching. It can scarcely be maintained that the opinions upon which these attempts have been based are built upon careful research or that the attempts at improvement have been evaluated. Critical and exact studies of university teaching still remain to be done, although there are signs within many departments that some aspects are being given careful attention.

Sociological determinants have been scrutinized. Although the effect on a student's motivation of being fully supported by home and family

expectations appears to need no further confirmation, attention is now being given to fostering equally powerful drives in students coming from homes without such support. Higher and higher proportions of students are entering universities from homes without a tradition of higher education, and more positive efforts must be made by the university staffs under such circumstances to make the transition to and acceptance of university life and university teaching easier than it would otherwise be.

Sociologically oriented research has generally been exact, careful, and painstaking, and it has revealed many important facts and problems. Such research needs to be supplemented with further studies that will not only uncover problems but also show how students overcome difficulties both within the normal framework of university life and organization and within any special framework created for them. Moreover, sociological research needs to be supplemented by controlled studies to assess the value of many suggested remedial measures. Do improvements in reading skills lead to better results? Does a tutorial system help students to adjust better to university life and to succeed where otherwise failure might have occurred? Does improvement in lecturing skill lead to better results and make a subject more enjoyable? These and other problems may be given attention in the next decade.

The enormous field of controlled evaluation of the effectiveness of university studies remains untouched. Many of the reported objectives of a university, apart from acquisition of professional knowledge and skills, are probably attained by many who have no formal association with a university. It is the lack of such positive evaluation that makes it easy for the timid, even in high places, to wish to limit university studies to a narrower range of ability than is possessed by those at present aspiring to them. Participation in the marketplace is a sure way to deprive a university of its sacrosanct status, and this must then be replaced with a clear-cut delineation and defense of its peculiar objectives. To this task no university research work has yet been dedicated.

Adolescence

A great deal of research has been done on different aspects of adolescence in Australia. Under the auspices of the Australian Council for Educational Research, Oddie and Spearritt (1958) examined the educational activities of adolescents in Victoria between the ages of 14 and 20 and found that part-time education was undertaken by a high proportion at each age. In another investigation the Australian Council for Educational Research (1960) analyzed successive age-grade tables and predicted numbers leaving school over the next five years in each of the mainland states, noting particularly the steady trend to stay in school longer.

Dufty (1960) found that many adolescent boys aspire to occupations well above their ability to attain them—professional and adventure-oriented occupations were most frequently selected. The intrinsic nature of the work was the most important factor in the choice made by the 1313 boys.

Wheeler (1961) examined the expressed wishes of adolescent boys and girls and found a distinct developmental trend, from concern with the present to concern with the future, as the pupils became older. Response differences between sexes were found in the younger subjects more frequently than in the older. An analysis of the subjects' views about adolescence showed that they were concerned with freedom from parental control and with establishing good relations with their peers. Harwood (1959) found Queensland adolescents adopting characteristic sex roles, but neither sex was adequately prepared for marital and parental responsibilities.

Analysis and Comment

No sociologist has attempted to discover what different value systems are held in Australia about such vital matters in an adolescent's life plan as work, ownership, marriage, children, or political affiliation. The field here is wide, open for careful exploration. Harwood's (1959) work touched briefly on some of these matters, but much deeper soundings are needed over a far wider field. Questionnaire and large-survey methods do not seem appropriate here. Carefully planned interview studies in a number of different centers would be essential.

Impact of Television

Several general studies of the changes in family activities associated with the advent of television have been prepared and not yet published. Fairbrother (1960) found that the first effects of television in Sydney were very similar to those reported in the United Kingdom and the United States. Emery and Martin (1957) studied the effects of a TV Western film on a child audience (43 boys aged 10 to 13) from lower-middle-class homes and found evidence sufficient to justify the following as working hypotheses for further studies: (a) latent rather than manifest themes are important in such films; (b) individual viewers use selective processes to defend themselves from anxiety; and (c) certain temporary changes in the way an individual sees himself in his environment may be brought about by such films.

Measurement

Beswick and Cox (1958) derived apparently economical and valid measures of adjustment, aggression, and dependence from children's re-

ports about each other. Cox (1960) studied correlates of general and test anxiety and found *inter alia* little relation between sociological and ecological variables and either scale. Moderate anxiety on both scales was most strongly related to competent school work.

Cochrane (1959) warned against the use of achievement quotients based on mental age. For children classified as slow learners, such quotients may be positively misleading.

Bibliography

- ANDERSON, A. W. "Personality Scores of Western Australian University Students Entering from State and Private Schools." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 4: 123-25; July 1960.
- AUSTRALIAN COUNCIL FOR EDUCATIONAL RESEARCH. *School Pupils and School Leavers in Five States*. Information Bulletin No. 42. Melbourne: the Council, 1960. 19 p. (Mimeo.)
- AUSTRALIAN UNIVERSITIES COMMISSION. *Report on Australian Universities 1958-63*. Canberra: Government Printer, 1960. 77 p.
- BESWICK, D. G., and COX, F. N. "Reputed Aggression and Dependence in Children." *Australian Journal of Psychology* (Australian Branch, British Psychological Society) 10: 144-50; September 1958.
- BORRIE, W. D., and DEDMAN, R. M. *University Enrolments in Australia 1955-70*. Canberra: Australian National University, 1957. 20 p.
- BROWN, M. S., and ALLEYNE, E. "Life Achievements of Educable Sub-Normals." *The Slow Learning Child* (University of Queensland Press) 4: 78-91; November 1957.
- COCHRANE, R. G. "A Note on Achievement and the Achievement Quotient." *The Slow Learning Child* (University of Queensland Press) 5: 180-85; March 1959.
- COCHRANE, R. G. "Intellectual Levels of Children Regarded as School Problems." *The Slow Learning Child* (University of Queensland Press) 7: 37-48; July 1960.
- COMMONWEALTH OFFICE OF EDUCATION. "Factors Affecting the First Year Performance of Commonwealth Scholars at Universities." *Education News* (the Office, Sydney) 7: 14-15; December 1959.
- COMMONWEALTH OFFICE OF EDUCATION. *After Graduation—What?* Sydney: the Office, 1961. 26 p. (Mimeo.)
- COX, F. N. "Correlates of General and Test Anxiety in Children." *Australian Journal of Psychology* (Australian Branch, British Psychological Society) 12: 169-77; December 1960.
- DANZIGER, K. "Children's Earliest Conceptions of Economic Relationships." *Journal of Social Psychology* 47: 231-40; May 1958.
- DANZIGER, K., and SHARP, N. "The Development of Children's Explanations of Growth and Movement." *Australian Journal of Psychology* (Australian Branch, British Psychological Society) 10: 196-207; September 1958.
- DAVIS, R. B. *Estimates of Australian University Enrolments 1960-74*. Sydney: University of New South Wales, 1960. 36 p.
- DUFFY, N. F. "Vocational Choices of 13 and 14 Year Old Males in Relation to Intelligence and Reasons for Job Choice." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 4: 38-56; April 1960.
- EMERY, F., and MARTIN, D. *Psychological Effects of the Western Film: A Study on Television Viewing*. Melbourne: Department of Visual Aids, University of Melbourne, 1957. 47 p.
- FAIRBROTHER, J. E. "The Impact of Television on the Primary School Child." *The Leader* (Department of Education, New South Wales) 5: 74-78; 1960.
- FOGARTY, R. *Catholic Education in Australia 1806-1950*. Melbourne: Melbourne University Press, 1959. Vol. 1 and 2, 567 p.
- GUNN, J. S. "Speech of Teachers' College Students." *Forum of Education* (Teachers College, Sydney) 19: 16-32; April 1960.
- HARSANYI, A. "Teacher Attitudes and Objective Observations of the Pre-School Children's Behaviour." *Australian Pre-School Quarterly* 1: 26-27; February 1961.

- HARWOOD, E. "Social Development in the Queensland Adolescent." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 3: 77-89; July 1959.
- MEDDLETON, I. G. "Prediction of Results of First Year University Students in the University of Queensland." *The Educand* (University of Western Australia) 4: 96-104; November 1960.
- MURRAY, K. A. H., chairman. *Report of the Committee on Australian Universities*. Canberra: Government Printer, 1957. 134 p.
- ODDIE, N. M., and SPEARRITT, D. *Some Activities of Australian Adolescents*. The Educational Activities of Victorian Adolescents, Vol. I. Melbourne: Australian Council for Educational Research, 1958. 164 p. (Mimeo.)
- OLSEN, F. J. "Failure in First-Year University Examinations." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 1: 175-86; November 1957.
- PIDGEON, D. A. "A Comparative Study of Basic Attainments." *Educational Research* (United Kingdom) 1: 50-68; November 1958.
- QUEENSLAND DEPARTMENT OF EDUCATION. *Reading Methods in Queensland Infants' Schools*. Bulletin No. 17. Brisbane: the Department, 1958. 44 p. (Mimeo.) (a)
- QUEENSLAND DEPARTMENT OF EDUCATION. *Studies in Spelling*. Bulletin No. 16. Brisbane: the Department, 1958. 12 p. (Mimeo.) (b)
- QUEENSLAND DEPARTMENT OF EDUCATION. "An Experiment in Remedial Teaching." *Education Office Gazette* 61: 126-32; April 1959. (a)
- QUEENSLAND DEPARTMENT OF EDUCATION. "A Study of the Improvement Through Maturation Shown by Speech-Defective Children in Grade 1." *Education Office Gazette* 61: 196-99; June 1959. (b)
- QUEENSLAND DEPARTMENT OF EDUCATION. *Two Studies in Reading*. Bulletin No. 21. Brisbane: the Department, 1960. 18 p. (Mimeo.)
- RICHARDSON, J. A. "Physical Factors in Reading Failure." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 2: 1-10; April 1958. (a)
- RICHARDSON, J. A. "The Teaching of Phonic Analysis and the Problem of Reading Backwardness." *Queensland Teachers' Journal* (Queensland Teachers' Union) 63: 18-20; July 1958. (b)
- RORKE, M. W. *The Vocational Contributions of Women Graduates of the University of Queensland*. Faculty of Education, University of Queensland, Research Study No. 6. Brisbane: University of Queensland Papers, Vol. 1, No. 1, 1959. p. 9-12.
- SANDERS, C. *Report on Academic Wastage and Failure Among University Students in Australia and Other Countries: 1928 to 1958. A Review of Research and Opinion*. Perth: University of Western Australia, 1958. 48 p. (Mimeo.)
- SCHONELL, F. J.; MEDDLETON, I. G.; and WATTS, B. H. *School Attainments and Home Backgrounds of Aboriginal Children*. Faculty of Education, University of Queensland, Research Study No. 7. Brisbane: University of Queensland Papers, Vol. 2, No. 1, November 1960. 44 p.
- SCHONELL, F. J., and OTHERS. *First and Second Surveys of the Effects of a Sub-Normal Child on the Family Unit*. Faculty of Education, University of Queensland, Research Study No. 5. Brisbane: University of Queensland Papers, Vol. 1, No. 2, 1959. 24 p.
- SCOTT, P. "Some Geographic Aspects of the Selection and Examination Performance of Full-Time University Performance in Tasmania." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 3: 129-43; November 1959.
- WALKER, A. P. "The Teaching of Spelling: An Experiment in Pre-Testing." *The Slow Learning Child* (University of Queensland Press) 6: 137-44; March 1960.
- WESTERN AUSTRALIA DEPARTMENT OF EDUCATION. "Research Projects in Reading." *Education Circular* 61: 229-32; October 1959.
- WESTERN AUSTRALIA DEPARTMENT OF EDUCATION. "The Effectiveness of a Readiness Program on Achievement in Reading." *Education Circular* 62: 185-87; July 1960. (a)
- WESTERN AUSTRALIA DEPARTMENT OF EDUCATION. "The Primary Reading Scheme." *Education Circular* 62: 11-12; February 1960. (b)
- WHEELER, D. K. "Expressed Wishes of Adolescents Still at School." *Australian Journal of Education* (Australian Council for Educational Research, Melbourne) 5: 84-90; July 1961.

New Zealand—George W. Parkyn

EDUCATIONAL RESEARCH in New Zealand is supported by, and for the most part carried out under the auspices of, three different kinds of educational institutions: the universities, the New Zealand Department of Education, and the New Zealand Council for Educational Research. In keeping with the tradition of the university, its teachers undertake scholarly inquiry and research into any problems that interest them; the wide range of these problems will be noted in this chapter, for most of the studies reported here as appearing in learned journals have been carried out by university teachers. The amount of research being done by university students is also considerable, and, although university theses are not reported, a useful analysis of trends in research carried out for education theses from 1923 to 1958 will be found in the article by Watson (1960b). Officers of the New Zealand Department of Education undertake much research on problems of immediate administrative concern, and the results of this work, while seldom published under the names of the participating research personnel, will be found in the annual reports of the Department (1956, 1957, 1958, 1959, 1960, 1961). The New Zealand Council for Educational Research (1935) is an independent body that tends, in the main, to sponsor investigations into issues of long-term educational policy and to publish annual reports of its research.

History and Theory of Education

During the past decade many primary schools have celebrated the sixtieth or seventy-fifth anniversaries of their foundings, and in most cases brief histories of the schools have been published. They are too numerous to list here, and their importance individually is mainly local. Together with those that will be written during the coming decade, however, they will provide useful material for future national historians. Works of wider importance are a massive centennial history of the Auckland Education Board by Cumming (1959) and a centennial history of the Otago Education Board by Miller (1957). Of narrower scope is a study by Holst (1958) of the part played by Maori schools in bringing education to backward rural areas.

Policy and Administration

The somewhat unusual administrative structure of New Zealand primary education, in which much of the control of the schools is placed in the hands of district boards of education that do not levy their own education taxes or rates but receive their funds from the central government through

its Department of Education, was the subject of a thorough analysis, carried out by a joint committee representing the Department and the boards, with a view to solving some of the problems of centralized *versus* decentralized control. A succinct explanation of the problems and of the committee's proposed solutions was set out by Beeby (1957) in the 1957 annual report of the New Zealand Department of Education. The role, and control, of the expert in educational administration has been perceptively discussed by Beeby (1959a).

Rising enrollments have been the concern of administrators at all levels, and problems and methods of prediction have been well dealt with by Jacoby (1958b, 1959), who has been responsible for projecting New Zealand's primary, secondary, and university enrollments through the next decade (see New Zealand Department of Education, 1957b).

Yearly promotion practices were studied by Colgan (1958), who showed the long-term importance of accurate placement of children in "Standard 1" (the third grade of the New Zealand primary school, usually entered after two years in the "infant" or "primer" classes by children of seven to eight years of age).

The intermediate schools of New Zealand, two-year schools whose purpose is to ease the transition between primary schooling and secondary schooling, have been the subject of an exhaustive, five-year investigation by Watson (1961). Although the full report has not yet been published, Watson (1961) has presented a summary of conclusions that affirm the value of this type of transitional school.

The general problems of the nonselective secondary-education system have been outlined by Beeby (1956), and a survey by Thompson (1958) has dealt with the question of coeducation from the point of view of parents who have the choice of coeducational or single-sex schools for their children.

The universities have been the subject of much investigation over the past five years. The difficulty in clarifying the aims of the university system, which, although based upon the British tradition, has moved some distance toward practices of the United States, has been analyzed by Beeby (1959b). A determined effort to set clear goals for the immediate future was apparent in a report made by the Committee on New Zealand Universities (1959), which contains data derived from research into many aspects of university organization and activity. The establishment in 1948 of the University Grants Committee has had a far-reaching effect upon university development. A brief historical study of its work has been made by Currie (1960).

Curriculum

The process of primary-school curriculum revision in New Zealand has tended in recent years to involve practical research and experimental

tion carried out by officers of the Department of Education in close co-operation with classroom teachers. Current procedures are described in a United Nations Educational, Scientific, and Cultural Organization (1958) document. The nineteenth-century British origins of the primary-school curriculum in New Zealand have been clarified by Ewing (1960), and Dinnis (1960) has made a survey of the views of parents on the present primary-school curriculum.

Beeby (1958) has made an analysis of curriculum changes in the secondary schools during the past 15 years. In higher education much discussion has taken place concerning the separate subjects of the curriculum, but on the whole little research has been carried out. Parton (1961) has published a useful paper on the education of chemists.

Educational Measurement and Evaluation

A restandardization of Thurstone's *Primary Mental Abilities* test (Intermediate Form) for ages 11-17 years was carried out by Rogers (1956) in the Auckland district. James Ritchie (1957) compared results of testing both Maori and European secondary-school pupils in a rural area with the *Wechsler-Bellevue Intelligence Scale* and found the European scores to be higher on both the verbal and nonverbal tests. McCreary, (1958), in a report on the use of the *A.C.E.R. Silent Reading Tests* and the *A.C.E.R. Arithmetic Tests* in a Maori school, has shown how useful an evaluative project of this nature can be to the teacher. Fieldhouse (1957a) has written a guide for those who wish to assess the reading attainments of their pupils. Fieldhouse (1957b) standardized the *A.C.E.R. Arithmetic Tests* for New Zealand use. He (1956) made a comparative study of standards of mechanical arithmetic in this country and Australia and found little difference, except for the marked superiority of the state of Queensland over the other Australian states and over New Zealand.

At the secondary level, two committees have dealt with problems connected with the School Certificate Examination. The first (Committee To Review the Post-Primary Curriculum and the School Certificate Examination, 1957) was concerned mainly with an evaluation of the effects of the scaling of examiners' marks on the position of candidates in different subjects; the second (School Certificate Review Committee, 1960) dealt with the essential nature of the School Certificate qualification itself.

The performance of first-year university students has been the subject of much concern. Parkyn (1959), in a large-scale research project involving over 4000 students, showed that within this already highly selected group differences in their university performance were not highly correlated with differences in their secondary-school attainments and that, in consequence, failures could not in general be attributed to the standard of the entrance qualification.

Educational Psychology

Valuable studies by Lawrence (1957a, b) of intelligence-test errors threw light on the cognitive processes and showed the significance of method in intellectual tasks. Sampson (1961), continuing work begun in Canada, showed the importance of pacing upon performance in the adding of digits. Sampson and Spong (1961) carried out experiments to study the properties of the central integrating mechanism dealing with sense-organ impulses.

In a series of related studies dealing with the emotional tone or climate of the classroom, Connor (1960a, b) demonstrated the extent to which the social contacts of the children were richer and the pupil-teacher rapport was closer in better classrooms. Continuing work begun in the United States, Flanders (1960) showed how classroom climate could be improved when teachers achieved a better balance between direct and indirect verbal methods of influencing their pupils. Pringle (1957) showed how teachers could solve some of the adjustment problems of their classrooms by using data gained from sociometric surveys.

Delinquency

Results of a large-scale statistical study of 10,000 juvenile delinquents, carried out by the Child Welfare Division, were given in the 1957 annual report of the New Zealand Department of Education (1957a). Mitchell (1956) analyzed the causative factors involved in 90 cases of delinquency studied in a university clinic. Connor (1959) examined trends in the development of the work done by the same university clinic over a period of years.

Educational Sociology

The gainful employment of school children in their out-of-school time was surveyed by Connor (1958); the problems of young Maoris at the beginning of their careers were analyzed by Roe (1961); and Jacoby (1958a) has presented estimates of the quantity and educational quality to be expected in the school-leaving population of the next few years.

Physical Development

A height-weight graph for secondary-school pupils was produced by Smithells (1958), and the value of height-weight indexes was discussed by Buckton (1958).

A great deal of attention has been focused upon the characteristics of the personality structure of Maoris. Using the Rorschach test and physical

measurements, Adcock and others (1957) studied the major differences between Maori and European personality traits and tested hypotheses about the relationship between temperament and physique. James Ritchie's (1956) study of basic personality, using the Rorschach test, has been followed by several studies to elucidate problems of the different developmental stages: Jane Ritchie (1957) has dealt with the first five years of life; Earle (1958), with the period of childhood; and Mulligan (1957), with adolescence. A criticism of the methodology in these studies was made by Metge and Campbell (1958). Ausubel (1961) has made a detailed study of the vocational ambitions and the personality traits needed for their fulfillment in rural and urban Maori youths.

Teaching Methods: Language Arts, Science, and Useful Arts

Osborn (1960) surveyed New Zealand libraries and evaluated use of school libraries. Wards (1961) has shown the wide range of vocabulary to be found in secondary-school beginners and the marked linguistic poverty of pupils of low ability. Arvidson (1960) prepared a manual for use with the *NZCER Alphabetical Spelling Lists*, the appearance of which has seemingly led to many radical changes in the methods of teaching spelling in most primary schools.

Primary-school science was examined by Johnston (1958); and the teaching of chemistry, by Searle (1956). In a comprehensive historical study and an analysis of present-day secondary-school methods, Searle (1958) has demonstrated clearly the difference between teaching science and teaching useful knowledge and has indicated the difficulties in the way of a better approach to teaching science in the schools.

Special Education and Special Programs

Winterbourn (1958) has considered the needs of intellectually handicapped children. Special provision for slow learners in the secondary school has been dealt with by Roberts (1958) and by Winterbourn (1957). Caughley (1961) has studied the use of group therapy in remedial speech work. Jeffery (1959) has developed a two-dimensional theory of stammering and has indicated some implications for remedial work.

The educational difficulties of Maori pupils are being given increasing attention. A general survey of the classroom problems confronting teachers was made by Parkyn (1961), and secondary-school problems were reported on by Baigent (1959) and Holst (1957). Davies (1959) has made a careful assessment of the problems of schooling in the South Pacific islands.

Teachers

Preliminary reports from a long-term, comprehensive study of adjustment of young teachers to their professional responsibilities have been issued by Watson in four papers. In the first report, Watson (1956) collated information on the intellectual background of teachers-in-training since 1940. In another, he (1958b) reviewed data on the intellectual status of entrants to different courses in 1957. Watson's (1958a) third report furnished test results on three basic subjects of the primary-school curriculum. In a fourth paper, Watson (1960a) reported on the university studies of prospective teachers.

Williams (1960) has carried out a well-designed study of the levels and pattern of achievement motivation among highly acculturated Maori teacher-trainees.

The Commission on Education in New Zealand (1960) presented an interim report on the staffing and recruitment of teachers 'to meet the present shortage. Bull (1960) made a detailed study of the qualifications and supply of teachers of mathematics in secondary schools. Hill (1959) demonstrated changes in the authoritarian attitudes of teacher-trainees during their college years.

Bibliography

- ADCOCK, CYRIL J., and OTHERS. "Personality and Physique: A Rorschach Study with Maori and European Subjects." *Australian Journal of Psychology* 9: 158-89; December 1957.
- ARVIDSON, GORDON L. *Learning To Spell: A Manual for Use with the NZCER Alphabetical Spelling Lists*. Studies in Education, No. 17. Wellington: New Zealand Council for Educational Research, 1960. 35 p.
- AUSUBEL, DAVID P. *Maori Youth*. Publications in Psychology, No. 14. Wellington: Department of Psychology, Victoria University College, 1961. 221 p.
- BAIGENT, AUBREY G. A. "Maori Pupils: A Report on a Questionnaire." *New Zealand Post-Primary Teachers' Association Journal* 5: 15-17; August 1959.
- BEEBY, CLARENCE E. "New Zealand: An Example of Secondary Education Without Selection." *International Review of Education* 2: 396-409; 1956.
- BEEBY, CLARENCE E. "Administration of the Schools." *Annual Report for the Year Ended 31 December 1956*. New Zealand Department of Education, Appendices to the Journals of the House of Representatives, E-1, 1957. Wellington: Government Printer, 1957. p. 5-19.
- BEEBY, CLARENCE E. "The Post-Primary Curriculum." *Annual Report for the Year Ended 31 December 1957*. New Zealand Department of Education, Appendices to the Journals of the House of Representatives, E-1, 1958. Wellington: Government Printer, 1958. p. 5-19.
- BEEBY, CLARENCE E. "The Control of the Expert." *The Expert and Administration in New Zealand*. (Edited by N. C. Angus.) Wellington: New Zealand Institute of Public Administration, 1959. Chapter 4. (a)
- BEEBY, CLARENCE E. "Some Problems of the University." *Annual Report for the Year Ended 31 December 1958*. New Zealand Department of Education, Appendices to the Journals of the House of Representatives, E-1, Sections A to J; 1959. Wellington: Government Printer, 1959. p. 5-17. (b)
- BUCKTON, BARRY S. "Height and Weight Can Be a Useful Index." *New Zealand Journal of Physical Education* 15: 27-29; July 1958.

- BULL, MERVYN A. *The Qualifications and Supply of Mathematics Teachers*. Studies in Education, No. 18. Wellington: New Zealand Council for Educational Research, 1960. 73 p.
- CAUGHLEY, NANCY. "Group Therapy in the Speech Clinic." *New Zealand Speech Therapists' Journal* 16: 24-27; May 1961.
- COLGAN, LESLIE J. F. "Age of Entry to Post-Primary Schools." *New Zealand Post-Primary Teachers' Association Journal* 4: 14-16; November 1958.
- COMMISSION ON EDUCATION IN NEW ZEALAND. *Interim Report on Post-Primary Staffing and Recruitment*. Wellington: Government Printer, 1960. 90 p.
- COMMITTEE ON NEW ZEALAND UNIVERSITIES (Sir David Hughes Parry, chairman). *Report*. Wellington: Government Printer, 1959. 130 p.
- COMMITTEE TO REVIEW THE POST-PRIMARY CURRICULUM AND THE SCHOOL CERTIFICATE. EXAMINATION WITH PARTICULAR REFERENCE TO THE POSITION OF LATIN AS A SCHOOL SUBJECT AND TO THE EFFECT OF SCALING (G. W. Parkyn, chairman). *Report of the Committee*. Wellington: Department of Education, 1957. 27 p. (Mimeo.)
- CONNOR, DAVID V. "School Children in Employment." *Labour and Employment Gazette* 8: 14-17; August 1958.
- CONNOR, DAVID V. "A Child Guidance Clinic in a University Setting." *Australian Journal of Psychology* 11: 202-208; 1959.
- CONNOR, DAVID V. "Behaviour in Class Groups of Contrasting Climate." *British Journal of Educational Psychology* 30: 244-49; November 1960. (a)
- CONNOR, DAVID V. "A Study of Classroom Climate." *National Education* 42: 67-69; March 1960. 42: 118-20; April 1960. (b)
- CUMMING, IAN. *Glorious Enterprise: The History of the Auckland Education Board 1857-1957*. Christchurch: Whitcombe and Tombs, 1959. 758 p.
- CURRIE, SIR GEORGE A. *The University Grants Committee 1948-1960*. Wellington: University of New Zealand, 1960. 11 p.
- DAVIES, FREDERICK R. J. "Problems in Pacific Islands Education." *Overseas Education* (London) 31: 69-76; July 1959.
- DINNIS, PETER R. "What Do Parents Want Schools To Do?" *National Education* 42: 502-503; December 1960.
- EARLE, MARGARET J. *Rakau Children from Six to Thirteen Years*. Publications in Psychology, No. 11. Wellington: Department of Psychology, Victoria University College, 1958. 108 p.
- EWING, JOHN L. *Origins of the New Zealand Primary School Curriculum, 1840-78*. Educational Research Series, No. 39. Wellington: New Zealand Council for Educational Research, 1960. 145 p.
- FIELDHOUSE, ARTHUR E. "Mechanical Arithmetic Standards in New Zealand." *National Education* 38: 373-75; November 1956.
- FIELDHOUSE, ARTHUR E. *How To Conduct a Reading Survey*. Studies in Education, No. 15. Wellington: New Zealand Council for Educational Research, 1957. 69 p. (a)
- FIELDHOUSE, ARTHUR E. *Manual of Direction for the A.C.E.R. Arithmetic Tests*. Wellington: New Zealand Council for Educational Research, 1957. 24 p. (b)
- FLANDERS, NED A. "A Study of Classroom Climate." *National Education* 42: 163-69; May 1960. 42: 226-29; June 1960.
- HILL, CLEMENT G. N. "Teacher Trainees and Authoritarian Attitude." *Australian Journal of Psychology* 11: 171-81; December 1959.
- HOLST, HALVOR. "The Maori Child's First Year at Post-Primary School." *Education* (Wellington) 6: 45-48; November 1957.
- HOLST, HALVOR. "The Maori Schools in Rural Education: An Historical Survey." *Education* (Wellington) 7: 53-59; March 1958.
- JACOBY, EDUARD G. "Future Supply of Juvenile Labour." *Labour and Employment Gazette* 8: 20-22; May 1958. (a)
- JACOBY, EDUARD G. "Kohorten-Analyse." *Allgemeines Statistisches Archiv*, No. 1: 21-28; 1958. (b)
- JACOBY, EDUARD G. *Methods of School Enrolment Projections*. Educational Studies and Documents, No. 32. Paris: UNESCO, 1959.
- JEFFERY, RAYMOND J. "Stammering: A Two-Dimensional Theory." *New Zealand Speech Therapists' Journal* 14: 18-24; May 1959.
- JOHNSTON, JAMES G. "Primary School Science." *National Education* 40: 23-25; February 1958.

- LAWRENCE, PHILIP J. "Some Characteristics of Incorrect Responses to Intelligence Test Items." *Australian Journal of Psychology* 9: 1-11; June 1957. (a)
- LAWRENCE, PHILIP J. "Study of Cognitive Error Through an Analysis of Intelligence Test Errors." *British Journal of Educational Psychology* 27: 176-89; November 1957. (b)
- MCCREARY, JOHN R. *A Report on the Administration of A.C.E.R. Attainment Tests to the Children of Ruatahuna*. Wellington: School of Social Science, Victoria University College, 1958. 12 p. (Mimeo.)
- METGE, JOAN, and CAMPBELL, D. "The Rakau Maori Studies." *Journal of the Polynesian Society* 67: 352-86; December 1958.
- MILLER, JAMES MCK. *The Otago Education Board 1856-1956: A Brief History*. Dunedin: Otago Education Board, 1957.
- MITCHELL, FRANK W. "A Study of 90 Cases of Delinquency." *Australian Journal of Psychology* 8: 47-60; June 1956.
- MULLIGAN, DAVID G. *Maori Adolescence in Rakau: A Thematic Apperception Test Study*. Publications in Psychology, No. 9. Wellington: Department of Psychology, Victoria University College, 1957. 127 p.
- NEW ZEALAND COUNCIL FOR EDUCATIONAL RESEARCH. *Annual Report*. Wellington: the Council. Beginning 1935.
- NEW ZEALAND DEPARTMENT OF EDUCATION. *Annual Reports*. Appendices to the Journals of the House of Representatives, E-1. Wellington: Government Printer, 1956, 1957, 1958, 1959, 1960, 1961.
- NEW ZEALAND DEPARTMENT OF EDUCATION. *Annual Report for the Year Ended 31 December 1956*. Appendices to the Journals of the House of Representatives, E-1, 1957. Wellington: Government Printer, 1957. p. 43-44. (a)
- NEW ZEALAND DEPARTMENT OF EDUCATION. *New Zealand University Enrolment: Projections to 1975*. Wellington: Government Printer, 1957. 6 p. (b)
- OSBORN, ANDREW D. *New Zealand Library Resources: Report of a Survey*. Wellington: New Zealand Library Association, 1960. 70 p.
- PARKYN, GEORGE W. *Success and Failure at the University, Academic Performance and the Entrance Standard*. NZCER Educational Research Series, No. 38. Wellington: New Zealand Council for Educational Research, 1959. 254 p.
- PARKYN, GEORGE W. "Research into the Schooling of Maori Children." *Post-Primary Teachers' Association Journal* 8: 13-14; November 1961.
- PARTON, HUGH N. "The Training and Education of Chemists." *Journal of the New Zealand Institute of Chemistry* 25: 165-79; October 1961.
- PRINGLE, DAVID J. C. "A Sociometric Survey: What Children Think of One Another." *National Education* 39: 422-25; December 1957.
- RITCHIE, JAMES E. *Basic Personality in Rakau*. Publications in Psychology, No. 8. Wellington: Department of Psychology, Victoria University College, 1956.
- RITCHIE, JAMES E. "Some Observations on Maori and Pakeha Intelligence Test Performance." *Journal of the Polynesian Society* 66: 351-56; December 1957.
- RITCHIE, JANE. *Childhood in Rakau; the First Five Years of Life*. Publications in Psychology, No. 10. Wellington: Department of Psychology, Victoria University College, 1957.
- ROBERTS, MARGARET A. "Slower Learners in New Zealand Post-Primary Schools." *The Slow Learning Child* (University of Queensland Press) 5: 111-16; November 1958.
- ROE, NOEL M. "The Young Maori Beginning His Career." *Education* (Wellington) 7: 195-201; August 1961.
- ROGERS, CYRIL A. *Measuring Intelligence in New Zealand*. Monograph Series No. 2. Auckland: Auckland University, 1956. 127 p.
- SAMPSON, HERBERT. "Order Effects of Different Pacing Rates on Serial Adding." *Australian Journal of Psychology* 13: 39-43; June 1961.
- SAMPSON, H., and SPONG, P. "Binocular Fixation and Immediate Memory." *British Journal of Psychology* 52: 239-48; August 1961.
- SCHOOL CERTIFICATE REVIEW COMMITTEE (F. R. G. Aitken, chairman). *Report of the School Certificate Review Committee*. Wellington: Government Printer, 1960. 35 p.
- SEARLE, ERNEST J. "The Teaching of Chemistry." *Journal of the New Zealand Institute of Chemistry* 20: 3-23; February 1956.

- SEARLE, ERNEST J. *The Teaching of Science in Post-Primary Schools*. Educational Research Series, No. 37. Wellington: New Zealand Council for Educational Research, 1958.
- SMITHELLS, PHILIP A. "Height-Weight Graph for New Zealand Post-Primary Schools." *New Zealand Journal of Physical Education* 15: 30-31; July 1958.
- THOMPSON, RICHARD H. T. "Co-Education: A Survey of Parental Opinion." *Australian Journal of Psychology* 9: 58-68; June 1957.
- UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANIZATION. *Curriculum Revision and Research*. Educational Studies and Documents, No. 28. Paris: UNESCO, 1958. p. 14-15.
- WARDS, RAYMOND J. "The Vocabulary of the Third Former." *Education* (Wellington) 10: 53-55; March 1961.
- WATSON, JOHN E. *The Intellectual Status of Students Entering Teachers' Colleges 1941-1956*. Bulletin No. 5. Wellington: New Zealand Council for Educational Research, 1956. 11 p. (Mimeo.)
- WATSON, JOHN E. *The Attainment of Teachers' College Students in Primary School Subjects*. Bulletin No. 7. Wellington: New Zealand Council for Educational Research, 1958. 35 p. (Mimeo.) (a)
- WATSON, JOHN E. *The Intellectual Status of Entrants to the Teaching Profession 1957*. Bulletin No. 6. Wellington: New Zealand Council for Educational Research, 1958. 12 p. (Mimeo.) (b)
- WATSON, JOHN E. *Entrance to the Teaching Profession: Progress Report on NZCER Study*. Bulletin No. 8. Wellington: New Zealand Council for Educational Research, 1960. 18 p. (Mimeo.) (a)
- WATSON, JOHN E. "Research Studies; Unsung and Unread." *Education* (Wellington) 9: 298-304; November 1960. (b)
- WATSON, JOHN E. "Intermediate Schools Again Supported by NZCER Research." *National Education* 43: 245-52; July 1961. 43: 513-15; December 1961.
- WILLIAMS, JOHN S. *Maori Achievement Motivation*. Publications in Psychology, No. 13. Wellington: Department of Psychology, Victoria University College, 1960. 113 p.
- WINTERBOURN, RALPH. "Slow Learners at Post-Primary School." *The Slow Learning Child* (University of Queensland Press) 4: 69-77; November 1957.
- WINTERBOURN, RALPH. *Caring for Intellectually Handicapped Children*. Studies in Education, No. 16. Wellington: New Zealand Council for Educational Research, 1958. 44 p.

CHAPTER II

Canada

WILLARD BREHAUT and ROBERT W. B. JACKSON

EDUCATION is a provincial responsibility in Canada. For this reason, there is not 1 Canadian system of education but 11: 1 system for each of the 9 provinces and the 2 public-school systems within the province of Quebec. The total number of systems is increased to 12 when consideration is given to the provision of education for Indians and Eskimos by the Federal Government.

Educational research in Canada is conducted at the national and provincial levels as well as by school boards in the larger urban communities and by the universities. Among the national organizations most active in the promotion, support, and conduct of research in education are L'Association Canadienne des Educateurs de la Langue Française, the Canadian Education Association, the Canadian School Trustees' Association, the Canadian Teachers' Federation, the Canadian Universities' Foundation, the Education Division of the Dominion Bureau of Statistics, and the Industrial Foundation on Education. Each of these organizations has contributed to the growing research movement in education.

Provincial organizations for the promotion of research in education have sprung up across the nation. All provinces except Manitoba either have established or are establishing research councils. In addition, urban research bureaus either have been established or are planned for such leading cities as Vancouver, Edmonton, Calgary, Medicine Hat, Saskatoon, Regina, Winnipeg, Toronto, Ottawa, Montreal, and St. John.

Research at the university level conducted by staff members and by students proceeding to advanced degrees has continued to be of importance in the overall research production of the country. Practically all university colleges of education are centers of research activity. In addition, several universities serve as training grounds for research workers.

Organizations

Among the most significant developments in the relatively short history of educational research in Canada has been the formal establishment in 1960 of the Canadian Council for Research in Education. This organization is as yet a fledgling, but the role it will be called upon to play will be one of utmost importance—the promotion of research, the preparation of an index of Canadian research, the publication of a national journal of educational research, and the solicitation, receipt, and disbursement of funds for financial assistance for research activities.

It may be of encouragement to educational researchers elsewhere to know that the formation of the Canadian Council for Research in Education has not been achieved easily. Indeed, it represents the culmination of almost a generation of researchers' efforts. The highlights of this development may be reported as follows:

- 1937-38: The Canadian Council for Educational Research was formed in 1939; supported by a grant of \$10,000, payable over two years, from the Carnegie Corporation. This was a joint effort by the Canada and Newfoundland Education Association and the Canadian Teachers' Federation.
- 1945: The Canadian Council for Educational Research was disbanded when funds from the Carnegie Corporation were expended. It was then replaced by the Canada and Newfoundland Education Association Research Council for the purpose of taking over and continuing the work begun by the Canadian Council for Educational Research.
- 1953: The Canadian Education Association and the Canadian Teachers' Federation agreed to the formation of a central body which became known as the National Advisory Committee on Educational Research with power to invite other national bodies to participate. The only other body which was asked to participate prior to 1959 was L'Association Canadienne des Educateurs de la Langue Française. The aims and objectives established for the National Advisory Committee on Educational Research, which were quite similar to those proposed for the Canadian Education Association Research Division and for the Canadian Teachers' Federation Research Division, are incorporated in the constitution of the Canadian Council for Research in Education.
- 1953: The Research Division of the Canadian Teachers' Federation was established.
- 1958: The Research Division of the Canadian Education Association was formed. Support from a grant from Imperial Oil Ltd. of \$100,000 was realized. A research and information service was formed and supported by a grant from the Carnegie Corporation of \$100,000, payable over three years.
- 1959: Three other organizations—the Canadian Association of Professors of Education, the Canadian Association of School Superintendents and Inspectors, and the

Canadian School Trustees' Association—along with the Education Division of the Dominion Bureau of Statistics were invited to become full members of the National Advisory Committee on Educational Research. A proposal to establish on a more formal basis a central organization known as the Canadian Council for Research in Education was approved in principle by four of the constituent organizations, and a provisional constitutional committee was established.

- 1960: A constitution for the Canadian Council for Research in Education was written, and approval of it was given by all the constituent organizations.

Journals

An event of importance to Canadians interested in research in education occurred in October 1958 with the publication of the first number of the *Ontario Journal of Educational Research*. This issue was devoted entirely to a review of educational research in Canada for the years 1953-56 (Jackson, 1958b). Within the next year a publication of the Canadian Education Association, the *Canadian Research Digest*, joined the *Ontario Journal of Educational Research* and the *Alberta Journal of Educational Research*—the pioneer in the Canadian field—as the main Canadian journals devoted to the reporting of educational research. The *Alberta Journal of Educational Research* has continued to flourish. However, the Canadian Education Association publication has ceased to exist as a separate entity. It has been combined with the more general periodical, *Canadian Education*, to result in the journal titled *Canadian Education and Research Digest* in 1961. As indicated above, one of the objectives of the newly established Canadian Council for Research in Education is the publication of a national journal of educational research.

• Main Emphases in Educational Research

Two general educational areas have received researchers' greatest attention in Canada. The first of these areas is administration and supervision; the second is that of psychology and measurement. Taken together, these two account for four out of every five published studies by graduate students, and the proportion seems to apply to all other reported studies as well.

Although every educational level from primary school to university was represented among the research studies of the period under review, it is evident that secondary education received greater attention than either elementary or higher education.

Research Methods

An analysis of the research studies reported in educational journals, monographs, and research bulletins shows that more than one-half of the investigations depend largely on the survey method. Comparatively few experimental studies have been carried out, the largest single number of these dealing with the subject of arithmetic, with experiments in learning ranking next. Most of the historical studies were related to administration and supervision. Despite the fact that surveys of the aims of education were made, there was little indication of philosophical studies having been conducted—a trend which may be considered by some to run counter to the needs of the nation. It is of interest to note that more than a dozen essays about research in education were published, more than the number of studies about research.

Trends in Research

The chief trend to be noted in Canadian educational research is rapidly increasing quantity: more and more research is being conducted at all levels—national, provincial, local, and university. Although this quantitative trend may not have a direct qualitative correlative, Dunlop (1961) observed that a marked change has occurred since 1955 in levels of educational research, which he attributes in part to the presence of research funds and foundation grants and to availability of highly trained personnel.

Similarly, Katz (1960) has drawn attention to the exhaustive studies conducted by royal commissions in Canada.

Administration and Supervision

By far the largest number of research studies conducted in Canada have been related to the general area of administration and supervision. Within the past five years significant studies have been reported at the national, provincial, and local levels.

Two of the most important studies conducted at the national level were those of the Education Division of the Dominion Bureau of Statistics of Canada (1959, 1960) which, respectively, were concerned with the expenditure and income of university students and with the organization and administration of education in Canada. Other noteworthy nationwide studies reported were diversified ones conducted by the Canadian Teachers' Federation (1956, 1958, 1960). The Industrial Foundation on Education (1957, 1958) published two studies respectively concerned with augmenting corporate giving to higher education and with increasing student motivation.

Among the many studies pertaining to educational administration and supervision throughout Canada have been a number of historical studies. Two of these seem particularly noteworthy. Phillips (1957) offered the first comprehensive history of educational development embracing all parts of English and French Canada. An additional volume, prepared by Audet (1956), in the monumental series on education in French Canada, was completed, and work was begun on another. A comparatively large number of histories of educational institutions which will not be cited also appeared.

Numerous indeed were studies concerned with specific problems in administration and supervision. Only eight representative investigations will be cited. Andrews and Brown (1958) edited a monograph concerned with composite high schools in Canada. In two papers, Byrne (1957a, b) discussed aspects of administrative structure, and in a third he (1957c) proposed evaluative criteria for administrative leadership. Borgen (1960) set forth the legal basis for administrative decisions, and Lamb (1959) described at length the legal responsibility of the school board and teachers relative to school accidents. Uhlman (1960) discussed the effects of demographic and economic changes on school financing, and Ritchie and Worth (1960) considered nongraded elementary-school programs.

Curriculum and Methods of Teaching

Studies of the value of new teaching methods were made in various subjects and in different parts of the country. The most numerous studies in this area were made of the New Castle filmstrip method of teaching reading, several of which were reported on by McRobbie (1960). The use of the Cuisenaire method of teaching arithmetic was also the subject of studies by Trout (1959, 1960). Munro (1959) examined the learning resulting from the use of methods of varying meaningfulness. Sawicki (1958) studied the English program in Alberta, and Buckles (1956) examined the development of the high-school mathematics program in the same province.

Educational Measurement

One of the chief interests of researchers during the period under review has been the evaluation of student progress and the prediction of success. Several studies have been made in each of these areas, and there has been some construction of measuring instruments as well as analysis of existing ones.

Chief among the studies of student achievement is the Atkinson Study, which will be considered in detail in a subsequent section. Another investigation which is still in progress is the Carnegie Study, on which the only report to appear is that by MacEachern (1960). Both of these

studies are being conducted by the Department of Educational Research of the Ontario College of Education. Smaller-scale studies with similar purposes have been conducted within several provinces, but will not be cited.

Several studies concerned with evaluation of achievement have been reported; only six representative ones will be cited. In arithmetic, Pritchard (1956) surveyed the attainment of pupils in grade 5, and Peta (1956) evaluated the competence of junior high-school students. Coull (1956) completed an extensive normative survey of reading achievement, and Young (1956) studied qualitative aspects of reading performance. Buxton (1959) carried out an experimental study concerning skill in written expression. Factors related to academic underachievement in adolescents were the subject of a paper by Chabassol (1959).

Much attention was given to the analysis of marks and test scores. Five representative studies were those of Evenson and Smith (1958), upon university matriculation in Alberta; of Conway and Brown (1956), in scaling university entrance marks; of Crawford (1959), about consistency of grading mathematics papers; of Barrett (1960), concerning the predictive efficiency of objective tests given in grade 8; and of Pipher (1960), who appraised the use of the *Dominion Group Test of Learning Capacity*.

Educational Psychology

In educational psychology many studies appeared in the areas of gifted children and intelligence testing. Two publications by Housego and Mowat (1959) and by McRoberts (1959) are representative of those concerned with gifted children, as are those by Dockrell (1960) and MacArthur (1960) in intelligence testing.

The relationship between directed cognition and personality change was studied by Christensen and Macdonald (1960). Anderson (1958) reported on cognitive-function fluctuation, and subsequently Anderson (1959) investigated aspects of the consistency of the self-concept. The self in interpersonal theory was the area of inquiry by Brown (1957), and a study of the self-concept for students in grade 9 was made by Tashchuk (1957). Two other studies related to personality and motivation were those of Grapko (1960), who studied social expectancy and achievement in the development of emotional security in school-age children, and of Munro (1957), who investigated the structure of an adolescent peer group.

Research concerning cognitive processes included MacKinnon's (1959) volume of how children learn to read, Clegg's (1959) experiment on training through simulated learning situations, and two studies concerning problem solving by Feavyour (1960) and by Jenkinson and Lampard (1959).

Teacher Training and the Teaching Profession

Nelson and Worth (1960a, b) reported on the mathematical competence of prospective elementary-school teachers, and Lindstedt (1960) studied the relation between teachers' qualifications and the achievement in mathematics of their grade 9 students.

McBeath and Andrews (1960) studied teacher leader behavior in relation to teaching effectiveness, and Savage (1960) reported upon a study of the nature and prediction of teachers' authoritarianism in the classroom. Fleming (1956) reported on teacher supply and demand in Ontario.

Areas To Be Investigated

Despite the rapid increase in the extent of educational research in Canada, many important problems require investigation. Among these may be listed the following, which, according to a recent questionnaire survey conducted by Jackson (1958b), represent some of Canada's chief research needs: (a) comparative study of ability to pay for education, by provinces and communities; (b) comparative investigation of curricula in all provinces; (c) consideration of the problems of bilingualism; (d) analysis of programs of study for nonacademic students and drop-outs as well as for bright and other exceptional children; (e) examination of continuity of learning and intensive study of the learning process in the classroom situation; (f) critical evaluation of programs of teacher education; (g) long-term investigation of the development of intelligence; and (h) development of tests and norms for Canadian children.

Areas of Most Fruitful and Significant Research

A review of Canadian research in education during the past five years indicates that contributors have tended to avoid doing fragmentary research but instead have undertaken coordinated studies of major educational problems. This development is a most hopeful sign—one that points the way to real progress in research. It is because of the coordinated planning that has entered into two types of studies that these have been selected for detailed discussion as the most fruitful and significant research conducted in this country. The first of these types is the longitudinal study of students in an effort to find out, among other things, the extent of wastage of student ability at high-school and university levels. The second type of significant research to be discussed is that related to administration and supervision of education in Canadian school systems.

Utilization of Student Resources

The Atkinson Study of Utilization of Student Resources, begun in 1956, and the Carnegie Study of Identification and Utilization of Student Talent in High School and College, begun three years later, are large-scale follow-up investigations of almost complete groups of secondary students in the province of Ontario. From the beginning the Atkinson Study, which was concerned with some 9000 Ontario grade 13 students, was considered to be a pilot study for the much larger Carnegie Study of more than 90,000 Ontario grade 9 students. Each of these studies is continuing—the former near its final stages, the latter still in its early stages.

Katz (1960) has indicated that the Atkinson Study, with its numerous reports, may well be the most noteworthy educational research undertaken in Canada. Under the direction of a steering committee made up of representatives of Ontario universities, public and private secondary schools, the provincial department of education, and industry, the Study was directly supervised by Fleming and Jackson. Five research papers published thus far are those by Fleming (1959a, b), Fleming and Jackson (1956), and Jackson (1956, 1958a).

The following instruments were used in the Study during the students' final year of high school: (a) a four-page questionnaire completed by each student; (b) a one-page questionnaire completed for each student by a group of teachers; (c) the College Entrance Examination Board *Scholastic Aptitude Test*, verbal and mathematical sections; (d) the *School and College Ability Test*, verbal and quantitative sections; and (e) *The Nelson-Denny Reading Test*.

In addition, smaller numbers of students took the following supplementary tests: (a) the *Kuder Preference Record—Personal*, (b) the *Brown-Holtzman Survey of Study Habits and Attitudes*, and (c) the *Co-operative English Test*.

Two approaches were employed in the collection of data in the follow-up stage: (a) an appeal to educational institutions for student records and (b) a questionnaire to each individual. Other questionnaires pertaining to their later academic and vocational careers were completed by the students participating in the follow-up procedures. In addition, the universities, schools of nursing, teachers colleges, and other educational institutions made available all records pertaining to the Atkinson group.

The principal findings to date of the Atkinson Study may be summarized as follows: (a) Sex was an important selective influence, giving boys a much greater chance of entering grade 13 and of continuing to the university. The superior record of the girls in the university is, therefore, not surprising. (b) Students who continued their education in the university or in other institutions were, on the average, approximately one-half of a year younger than those who entered employment. (c) Boys were less likely to attend the university and more likely to obtain immediate employment if one or both parents were dead; girls showed a

slight tendency in the opposite direction. Students whose fathers were deceased had a reduced chance of success in the university. (d) The students who went to the university tended to come from smaller families and from families with higher educational levels. (e) Students were more likely to attend the university if their fathers were in a high occupational level. As far as success at the university was concerned, however, there was no apparent predictive value in the father's occupational level. (f) Students who had done their grade 13 work in continuation schools, high schools, and vocational schools were much less likely to enter the university than were those from the collegiate institutes, composite schools, and private schools. For those who attended the university, however, there was little relationship between the degree of success attained and the type of school attended. (g) Of the teachers' ratings employed (reliability, cooperation with teachers and students, leadership and good influence among students, industry in school work, initiative, physical stamina and energy, participation in sports, effects of absence on school work, and chances of university success), the best predictors of destination were ratings on industry in school work, initiative, and chances of university success. (h) Although students in the university-destination group had the highest average in each of the preceding high-school grades, there were many students in the nonuniversity-destination group with academic records equal or superior to a large proportion of the university-bound students. (i) Although effectiveness of prediction varied from university to university and from course to course, the grade 13 average was definitely the best predictor. (j) Median scores obtained by the Atkinson students on the aptitude tests were markedly superior to those obtained by corresponding groups in the United States.

The Carnegie Study of Identification and Utilization of Student Talent in High School and College, financed in part by a grant from the Carnegie Corporation, is a longitudinal investigation of the more than 90,000 grade 9 students in Ontario in 1959-60. This project is the largest of its kind ever undertaken in Canada and one of the few studies of this type not dependent upon a sampling of students.

Although it is only two years since this proposed 10-year study was begun, some important outcomes have already been realized. Foremost has been the development of several new measuring instruments—tests of achievement, aptitude, and interests. The standardization of these instruments on the 90,000 students represents a giant leap forward in the field of educational measurement in Canada.

The first of many reports to be issued on the results of the Carnegie Study was released in 1960. This report, *Twenty Questions*, prepared by MacEachern (1960), provided a very brief preliminary analysis of the Carnegie Study students' answers to the questions contained in the first student questionnaire. Many additional analyses of data will be made both during and after the follow-up period.

Research in Educational Administration

The leading Canadian center for research in educational administration and supervision is now the Division of Educational Administration of the University of Alberta (1960) in Edmonton. This development has been the outcome of the University's active participation in the CEA-Kellogg Project in Educational Leadership during 1951-56.

Although the research conducted has been related to the province of Alberta to a large extent, an important purpose of the Alberta program has been to choose and train individuals for positions of leadership in Canadian school administration. Hence the emphasis may be viewed as national rather than provincial.

Because the Division of Educational Administration of the University of Alberta was formed only five years ago, the amount of research completed is small in comparison with the research under way. What has been done, however, indicates that many facets of administration are receiving attention, especially those related to the roles of various persons—superintendent, principal, and vice-principal—and to various types of schools—composite and rural high schools, in particular.

Summary Evaluation of Research Methods Used

Among the most fruitful research methods being used in Canada today is the longitudinal study of large numbers of students. By this means it is possible to accumulate a great mass of information about the changes that occur in the personal and educational lives of the students and, by means of high-speed electronic data-processing, to undertake correlational studies using complete populations instead of samples.

Studies of this type must be well planned if the data collected are to be utilized effectively. During the planning period the need of a pilot project is very great, and the time and money spent in undertaking it will prove to be a profitable investment.

The importance of involving the individuals most directly concerned with a study and with the possible application of its findings must be noted in connection with another type of research—action research. The success of the University of Alberta's Division of Educational Administration in conducting research of this type is in no small measure related to the degree of involvement of those most directly concerned—the potential consumers of the research findings.

Bibliography

- ANDERSON, C. C. "Further Evidence on Cognitive Function Fluctuation." *Alberta Journal of Educational Research* 4: 40-49; March 1958.

- ANDERSON, C. C. "The Many Voices: A Preliminary Investigation into the Consistency of the Self Concept." *Alberta Journal of Educational Research* 5: 7-15; March 1959.
- ANDREWS, JOHN H. M., and BROWN, ALAN F., editors. *Composite High Schools in Canada*. University of Alberta Monographs in Education No. 1. Edmonton: Faculty of Education, University of Alberta, 1958. 111 p.
- AUDET, L. P. *Le Système Scolaire de la Province de Québec*. Tome 6: "La Situation Scolaire à la Veille de l'Union, 1836-1840" (The School System of the Province of Quebec. Vol. 6: The School Situation at the Advent of the Union, 1836-1840). Québec: Les Éditions de l'Erable, 1956. 353 p.
- BARGEN, P. F. "The Legal Basis for Administrative Decisions." *Canadian Education* 15: 40-60; September 1960.
- BARRETT, H. O. "The Predictive Efficiency of Grade 8 Objective Tests in Terms of Grade 9 Achievement." *Ontario Journal of Educational Research* 2: 101-108; April 1960.
- BROWN, ALAN F. "The Self in Interpersonal Theory." *Alberta Journal of Educational Research* 3: 138-48; September 1957.
- BUCKLES, IRENE E. "The Evolution of the Mathematics Programme in Alberta High Schools." *Alberta Journal of Educational Research* 2: 244-58; December 1956.
- BUXTON, E. W. "An Experiment To Test the Effects of Writing Frequency and Guided Practice upon Students' Skill in Written Expression." *Alberta Journal of Educational Research* 5: 91-99; June 1959.
- BYRNE, T. C. "Design and Structure in Canadian Education." *Alberta Journal of Educational Research* 3: 28-44; March 1957. (a)
- BYRNE, T. C. "The Development of Design in Alberta's Education." *Alberta Journal of Educational Research* 3: 72-80; June 1957. (b)
- BYRNE, T. C. "Evaluative Criteria of Provincial Leadership in Public Education." *Alberta Journal of Educational Research* 3: 180-92; December 1957. (c)
- CANADA, DOMINION BUREAU OF STATISTICS, EDUCATION DIVISION. *University Student Expenditure and Income in Canada, 1956-57*. Ottawa: Queen's Printer, 1959. 96 p.
- CANADA, DOMINION BUREAU OF STATISTICS, EDUCATION DIVISION. *The Organization and Administration of Public Schools in Canada*. Second edition. Ottawa: Queen's Printer, 1960. 232 p.
- CANADIAN TEACHERS' FEDERATION, RADIO RESEARCH PROJECT COMMITTEE. *Survey of Radio in Canadian Schools*. Research Study No. 1. Ottawa: the Federation, 1956. 179 p.
- CANADIAN TEACHERS' FEDERATION, RESEARCH DIVISION. *Educational Finance in Canada, 1946-1956*. Information Bulletin 58-1. Ottawa: the Federation, 1958. 58 p.
- CANADIAN TEACHERS' FEDERATION, RESEARCH DIVISION. *The Assignment of Educational Responsibility*. Research Study No. 5. Ottawa: the Federation, 1960. 39 p.
- CHABASSOL, D. J. "Correlates of Academic Underachievement in Male Adolescents." *Alberta Journal of Educational Research* 5: 130-46; June 1959.
- CHRISTENSEN, CLIFFORD M., and MACDONALD, JOHN. "Directed Cognition and Personality Change." *Alberta Journal of Educational Research* 6: 211-17; December 1960.
- CLEGG, WILLIAM C. "The Effectiveness of Practice in Simulated Situations as Training for Actual Use of a Skill." *Ontario Journal of Educational Research* 2: 1-14; October 1959.
- CONWAY, C. B., and BROWN, ELLEN L. "The Establishment of University Entrance Standards in Required and Optional Subjects." *Canadian Education* 11: 17-30; March 1956.
- COULL, WILLIAM H. "A Normative Survey of Reading Achievement of Alberta Children in Relation to Intelligence, Sex, Bilingualism, and Grade Placement." *Alberta Journal of Educational Research* 2: 18-29; March 1956.
- CRAWFORD, D. H. "An Introductory Study of the Consistency of Marking Mathematics Papers in Schools." *Alberta Journal of Educational Research* 5: 31-40; March 1959.
- DOCKRELL, W. B. "The Use of Wechsler Intelligence Scale for Children in the Diagnosis of Retarded Readers." *Alberta Journal of Educational Research* 6: 86-91; June 1960.

- DUNLOP, G. M. "Educational Research in Canada: Today and Tomorrow." *Second Canadian Conference on Research in Education*. Toronto: Canadian Education Association, 1961. p. 1-19.
- EVENSON, A. B., and SMITH, D. E. "A Study of Matriculation in Alberta." *Alberta Journal of Educational Research* 4: 67-83; June 1958.
- FEAVYOUR, HERMAN E. "Problem-Solving Ability in Arithmetic." *Ontario Journal of Educational Research* 2: 89-100; April 1960.
- FLEMING, W. G. *Estimates of Teacher Supply and Demand in Ontario Secondary Schools for 1957-72*. Information Series No. 3. Toronto: Department of Educational Research, Ontario College of Education, University of Toronto, 1956. 20 p.
- FLEMING, W. G. *The Kuder Preference Record-Vocational as a Predictor of Post High-School Educational and Occupational Choices*. Atkinson Study of Utilization of Student Resources, Supplementary Report No. 2. Toronto: Department of Educational Research, Ontario College of Education, University of Toronto, 1959. 49 p. (a)
- FLEMING, W. G. *Research into the Utilization of Academic Talent*. Paper delivered to Canadian Association of Professors of Education, 1959 Conference. Educational Research Series, No. 31. Toronto: Department of Educational Research, Ontario College of Education, University of Toronto, 1959. 26 p. (Mimeo.) (b)
- FLEMING, W. G., and JACKSON, R. W. B. "Tomorrow's Leaders: A Search for Talent." *Canadian Education* 11: 3-16; March 1956.
- GRAPKO, M. F. "The Significance of Social Expectancy and Achievement in the Development of Security in School Age Children." *Bulletin of the Institute of Child Study* 22: 7-11; September 1960.
- HOUSEGO, I. W., and MOWAT, G. L. "Alberta Composite High Schools and Gifted Youth." *Alberta Journal of Educational Research* 5: 23-30; March 1959.
- INDUSTRIAL FOUNDATION ON EDUCATION. *The Case for Corporate Giving to Higher Education*. Report No. 1. Toronto: the Foundation, 1957. 50 p.
- INDUSTRIAL FOUNDATION ON EDUCATION. *The Case for Increasing Student Motivation*. Report No. 3. Toronto: the Foundation, 1958. 44 p.
- JACKSON, R. W. B. "Atkinson Study and Educational Research." *Canadian School Journal* 34: 252; August-September 1956.
- JACKSON, R. W. B. *The Atkinson Study of Utilization of Student Resources in Ontario*. Educational Research Series, No. 29. Toronto: Department of Educational Research, Ontario College of Education, University of Toronto, 1958. 53 p. (a)
- JACKSON, R. W. B. "Survey of Educational Research in Canada 1953 to 1955-56." *Ontario Journal of Educational Research* 1: 1-141; October 1958. (b)
- JENKINSON, MARION D., and LAMPARD, DOROTHY M. "Problem Solving and Achievement." *Alberta Journal of Educational Research* 5: 166-72; September 1959.
- KATZ, JOSEPH. "The Status of Educational Research in Canada, 1957-1959." *Canadian Research Digest* 5: 1-11; Winter 1960.
- LAMB, R. L. *Legal Liability of School Boards and Teachers for School Accidents*. Research Study No. 3. Ottawa: Research Division, Canadian Teachers' Federation, 1959. 76 p.
- LINDSTEDT, SIDNEY A. "Teacher Qualifications and Grade IX Mathematics Achievement." *Alberta Journal of Educational Research* 6: 76-85; June 1960.
- MACARTHUR, R. S. "The Coloured Progressive Matrices as a Measure of General Intellectual Ability for Edmonton Grade III Boys." *Alberta Journal of Educational Research* 6: 67-75; June 1960.
- MCBEATH, A. G., and ANDREWS, J. H. M. "Teacher Leader Behavior and Teaching Effectiveness." *Alberta Journal of Educational Research* 6: 10-18; March 1960.
- MACEACHERN, D. G. *Twenty Questions. A Quick Look at 90,000 People: The Grade 9 Students in 800 Ontario Schools*. Carnegie Study of Identification and Utilization of Talent in High School and College, Bulletin No. 1. Toronto: Department of Educational Research, Ontario College of Education, University of Toronto, 1960. 15 p.
- MACKINNON, A. R. *How Do Children Learn To Read?* Toronto: Copp Clark Publishing Co., 1959. 276 p.
- MCRABBIE, K. A. *The Toronto New Castle Textfilm Reading Experiment*. Toronto: Ontario Educational Research Council, 1960. 39 p. (Mimeo.)
- MCRBERTS, ELEANOR. "Classes for Gifted Children—London, Ontario." *Education of the Gifted*. Fourteenth Yearbook of the Ontario School Inspectors' Association, Research Committee. Toronto: Copp Clark Publishing Co., 1959. p. 3-11.

- MUNRO, B. C. "The Structure and Motivation of an Adolescent Peer Group." *Alberta Journal of Educational Research* 3: 149-61; September 1957.
- MUNRO, B. C. "Meaning and Learning." *Alberta Journal of Educational Research* 5: 268-81; December 1959.
- NELSON, L. DOYAL, and WORTH, WALTER H. "The Mathematical Competence of Prospective Elementary Teachers." *Alberta Journal of Educational Research* 6: 3-9; March 1960. (a)
- NELSON, L. DOYAL, and WORTH, WALTER H. "Mathematics Preparation of Prospective Elementary Teachers." *Alberta Journal of Educational Research* 6: 236-40; December 1960. (b)
- PETA, STEPHEN BENJAMIN. "An Evaluation of Arithmetical Competence in the Junior High Schools of Lethbridge." *Alberta Journal of Educational Research* 2: 114-28; June 1956.
- PHILLIPS, C. E. *The Development of Education in Canada*. Toronto: W. J. Gage and Co., 1957. 626 p.
- PIPHER, J. A. "An Appraisal of the Use of the Dominion Group Test of Learning Capacity (Advanced) in the Atkinson Study of Utilization of Student Resources." *Ontario Journal of Educational Research* 3: 17-24; October 1960.
- PRITCHARD, RALPH O. "A Survey of the Arithmetical Achievement of Grade Five Pupils in Alberta Schools." *Alberta Journal of Educational Research* 2: 41-48; March 1956.
- RITCHIE, R. CAMERON, and WORTH, WALTER H. "Nongraded Elementary School Programs." *Alberta Journal of Educational Research* 6: 176-85; September 1960.
- SAVAGE, H. W. "The Manifestation and Prediction of Authoritarianism in Classroom Control." *Ontario Journal of Educational Research* 3: 9-16; October 1960.
- SAWICKI, STANLEY W. "The Development of the English Program in the Secondary Schools of Alberta." *Alberta Journal of Educational Research* 4: 142-51; September 1958.
- TASCHUK, W. A. "An Analysis of the Self-Concept of Grade Nine Students." *Alberta Journal of Educational Research* 3: 94-103; June 1957.
- TROUT, HECTOR G. "Controlled Experiment on New Mathematics Method." *Saskatchewan Bulletin* 25: 22-24; November 1959.
- TROUT, HECTOR G. "Don't Spare the Rods!" *Saskatchewan Bulletin* 26: 26-28; November 1960.
- UHLMAN, HAROLD J. "Demographic and Economic Changes." *Alberta Journal of Educational Research* 6: 29-37; March 1960.
- UNIVERSITY OF ALBERTA, DIVISION OF EDUCATIONAL ADMINISTRATION. *Graduate Program in Educational Administration, Annual Report, 1960*. Edmonton: the University, 1960. p. 1.
- YOUNG, CAMPBELL. "A Qualitative Analysis of Reading Achievement in Edmonton Schools." *Alberta Journal of Educational Research* 2: 135-50; September 1956.

CHAPTER III

Latin American Countries: Chile, Peru, and Puerto Rico

An Overview of Educational Research in Latin America—Pablo Roca

LATIN AMERICA is a term used for convenience to describe an area covering 20 independent nations located in North, Central, and South America, in which three different languages are spoken: Spanish in 18, Portuguese in 1, and French in another. The degree of educational development of these countries varies widely.

It has been estimated that the 20 Latin American countries had a total population in 1958 of about 188 million. Roca (1961) has reported that the expenditures for education amounted to about 1959 million U.S. dollars, or an average of about \$10 per inhabitant, and that the enrollment in the elementary schools would be about 22.1 million children and in the secondary schools, 2.6 million, with an average expenditure of \$68 per child enrolled at both levels. These enrollments constitute about 50 percent of the total population of elementary-school age, aged 5-14, and about 14 percent of that of secondary-school age, aged 15-19.

Problem Areas

In the field of education in Latin America there are many problems about which research could be oriented. In its latest report on Latin American education, the United Nations Educational, Scientific, and Cultural Organization (1960) mentioned the following points: (a) Rapid increase in the rate of population growth has aggravated the educational needs of the region. Estimates for 1966 indicate at least 35 million children between the ages of 7 and 12 years will be added to the present 15 million for whom there are no school facilities. (b) The ratio of the school-age population to the active working-age population, which is extremely high, probably will continue to increase in the immediate future. (c) The level of education of the population of workers is low. About one-half of the population has not completed even one year of schooling, and only about one-fifth has attained a primary education. This indicates that functional illiteracy may be really greater than what official figures show. (d) School statistics show that one-half of the children attending elementary school are in the first grade and that the proportion of those who complete primary education is very low. (e) Other problems exist concerning compulsory

school attendance, school organization, elementary rural and urban education, teaching personnel, school financing, and illiteracy.

A Few Recommendations

In its recent report of a mission to Venezuela, the International Bank for Reconstruction and Development (1961) surveyed the educational system of that country and recommended as a short-term objective that a larger proportion of children in primary school be retained than previously enrolled and that additional places for an increasing proportion of those attaining school age be provided. The writers of this same report cited poor teaching standards, low pupil aptitude, rigid promotion policies, and lack of availability of higher grades as the reasons for large repeater rates. They also recommended a new curriculum for the rural schools that not only would meet the needs of the dropouts but also would lead to a study program with a more practical bias related to the agricultural pursuits—activities in which the child is likely to subsequently engage.

At the intermediate level it was recommended that a testing program aimed at determining both educational attainments and scholastic aptitudes be established in order that students can be selected to follow the type of intermediate education most suited to their potentialities.

A Recent Survey

As reported by Hedrick (1959), the School of Inter-American Studies of the University of Florida distributed 7300 questionnaires to individuals doing research in Canada, the United States, and Latin American countries for its third survey of investigations in progress in the field of Latin American studies. Only 815 items were finally compiled, of which 22 were reported under the heading, Education. Of these, only 6 could be properly classified as research studies about Latin American educational problems.

Concluding Statements

Many and varied are the educational problems in demand of research at both the administrative and the professional levels. In some countries there is lack of trained personnel, but in all there is lack of resources.

In an area with so many basic educational problems, research in education might be looked at as an item of luxury or as an academic exercise to which only a few curious scholars devote part of their time. However, since the area covered by the term Latin America includes a large variety of stages of educational development, the field of educational research reflects the same levels of development. In some countries educational

research is completely nonexistent; in others it has developed to a degree comparable to that found in modern systems of education.

In this chapter a review of the work carried out in certain Latin American countries will be presented, not as representative of the whole area, but as conducted in selected individual countries. A wider coverage was not possible because of practical limitations arising from a lack of communication among the research workers in the different countries. This problem seems to be the greatest handicap to the development of educational research in Latin America, for, as may be seen later in this chapter, there is competent research going on in many Latin American countries, but lack of communication and dissemination renders it very little known and consequently of little use.

Bibliography

- HEDRICK, BASIL C. *Survey of Investigations in Progress in the Field of Latin American Studies*. Washington, D.C.: Pan American Union, September 1959. 76 p.
- INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT. *The Economic Development of Venezuela*. Baltimore: Johns Hopkins Press, 1961. 483 p.
- ROCA, PABLO. "Costos de la Educación" (Costs of Education). *La Educación* (Washington, D.C., Pan American Union) Nos. 21-22; January-June 1961.
- UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANIZATION. *La Situación Educativa en América Latina* (The Educational Situation in Latin America), Paris: UNESCO, 1960. 295 p.

Chile—Egidio Orellana

ONE OF THE MOST IMPORTANT manifestations of a recent renewal of interest in education in Chile—an interest associated with the anticipated impact of education upon the process of economic development—has been the creation of a number of centers for the purpose of investigating educational problems. Among such centers should be mentioned the Instituto de Investigaciones Pedagógicas de la Universidad de Chile (Institute of Educational Research of the University of Chile), founded in 1956 and divided into two independent ones, the Instituto de Investigaciones Estadísticas (Institute of Statistical Research) and the Instituto de Educación (Institute of Education) in 1960.

During the same year, specialized personnel competent in modern techniques of scientific research began to act in the country. After receiving their first training in some of the Chilean universities, the majority of these specialists were sent abroad—especially to the United States to undertake graduate studies.

Characteristics and Orientation of Educational Research

Aspects of the recent economic development under which a new renaissance of interest in education has been produced make it possible to understand the orientation that educational research has acquired in recent years, to explain some of its characteristics, and to understand the reasons for some omissions. Recent studies, especially those of the past five years, have been oriented toward the discussion of specific problems related to the practical needs of Chile. Although in previous epochs the educators' attention was directed to subject-matter content and to teaching methods employed, during the past few years there has been a dominant preoccupation for examining the relations that exist between the Chilean educational system and the social and economic conditions prevailing in the country.

Given this primary concern, it is no wonder that the need to know the characteristics of the national educational system has become highly important. In the search for the indispensable data necessary to describe current resources and to suggest future needs, a great deal of the research that has been done during the past five years has tended to be statistical in nature. An example of a statistical report is the recent one published by the Institute of Statistical Investigation (Instituto de Investigaciones Estadísticas, 1959) concerning entrance examination to the University of Chile. Additional useful reports have been forthcoming from the Superintendency of Education (Superintendencia de Educación, 1959, 1961), which has established a Section of Educational Statistics.

The desire to make education more effective as an instrument of social change also explains a tendency found in practically all recent studies

to consider the overall educational problems, rather than particular and limited aspects. It is striking in fact to note that investigations are either global studies of the development of the Chilean educational system, such as those by Grassau and Orellana (1959) and by Gutierrez (1960a, b); or they refer to the problems of articulation among the different levels of education, as in the report by Salas and Orellana (1958); or else they deal with the progress of the student body through the educational system, as illustrated in two papers by Grassau (1958a, b).

The present tendencies toward industrialization of the country and the strengthening of the democratic spirit of the nation have been reflected both in a noticeable increase of the enrollment within the elementary and secondary schools as well as within the universities and in a noticeable increase in the school retention rates. In view of the pressure of larger enrollments, there has been an increase in the number and form of admission examinations to the different types of schools.

It is not strange, therefore, that the interests of the investigators have moved also toward the study of examinations that contribute to a high degree in the determination of those who can continue their education, those who will not be able to continue, or those who should change their orientation. Significantly, the majority of the published works about tests, of which the one by Grassau (1957) is representative, have dealt with the university entrance examinations.

The process of democratizing education has given access to the schools to children from the lower social strata, who until recently had been deprived of its benefits. As a consequence, children with varied aptitudes, contrasting interests, and heterogeneous backgrounds are entering school. The change in the school population has made necessary a critical evaluation not only of the quality of teaching but also of its adaptation to the needs of individual students. Thus attention of the investigators should seemingly be directed toward the study of the reliability and validity of rating and testing systems in use. Undoubtedly such efforts should lead to very interesting results, inasmuch as the present subjective system of evaluation of school achievement yields only limited information.

Problems of Articulation Between Secondary and Higher Education

Salas and Orellana (1958) published a study dealing mostly with the relationship existing in Chile between courses in the *liceo* (secondary school) and in the university—especially in the sciences and mathematics. The authors started with the idea, widely circulated in the universities, that there had been a grave discrepancy between the basic scientific preparation attained by secondary-school students and the minimum requirements that the university deemed indispensable to initiate its own program. The procedure selected consisted of investigating, on one

hand, the manner in which secondary-school subjects were taught, the actual material covered, and the amount of knowledge that pupils effectively learned. The minimum requirements that the university deemed essential to initiate university studies were also examined. At the same time, in order to complete the picture of the requirements of university life, the investigators tried to identify interests and personal characteristics of the students. Results confirmed that there was a lack of continuity in courses of study and of coordination in the teaching emphases of secondary-school teachers and college professors.

From another point of view, Orellana (1958) undertook study of the problem of articulation between the *liceo* and the University of Chile. He investigated the factors that were determining the rapid expansion of the enrollment in higher education and also the factors that were limiting such expansion.

Selection Systems for University Students

Barros (1959) made a study of the baccalaureate examinations at Valparaiso's Catholic University. The entrance examination showed a very low correlation with success or failure in the University. Correlations with secondary-school marks were, on the contrary, much higher—a fact that led to the conclusion that the University's entrance examination was yielding little predictive information in addition to that provided by the high-school marks.

Viel and others (1956) and Viel and Rojas (1959) subjected the entrance examinations of the School of Medicine of the University of Chile to a detailed validation study. The technique consisted in studying the relation existing between the scores obtained in the entrance examination with success achieved by students admitted, as demonstrated by the number of achievement tests passed at the end of their first year of studies. Results obtained showed that secondary-school marks had a higher predictive value than the entrance examination, although they also indicated that there was some degree of correspondence between the two predictors. The general conclusion was that the validity of the selection procedure was increased when the two predictors were combined.

Education and Social Change

Hamuy (1960) explored the relations among elementary education, illiteracy, and economic development. The central idea reflected throughout Hamuy's report was that of education directed toward the fostering of course change rather than the retention of the status quo. His conclusion was that the fundamental problem of the school system of Chile lay in the early incidences of school mortality and in its consequences upon the level of education of the people.

Illiteracy, which is associated with low educational levels, was found to be intimately tied up with the existence of two elementary educational systems—the public and the private. Hamuy affirmed that since the two are not equivalent, one could not replace the other. He found that the private school system which flourishes primarily in the urban areas did tend to favor the privileged social classes more than did the public system. Given these characteristics, the dynamics of the private system and the stagnation of the public one, it seemed as if the two systems had joined forces to effect an educational program prejudicial to the rural population and to the low-socioeconomic urban classes.

Bianchi and Himmel (1961), on the other hand, tried to investigate how far the University of Chile discharged the task of serving as a vehicle for vertical social mobility. They utilized as a basis for this study a comparison between the occupational level of parents and the educational level of their children. They concluded that the schools of the University operating in the provinces did tend to effect vertical mobility to a greater extent than did those operating in the capital city. The investigation also disclosed that the amount of vertical mobility as evaluated by their technique was lower than that obtained in such other countries as England, the United States, Australia, and Brazil.

Bibliography

- BARROS, RAIMUNDO, S.J. "El Bachillerato de la Universidad Católica como Instrumento de Selección Universitaria" (The Baccalaureate Entrance Examination of the Catholic University as an Instrument of University Selection). *Album Prof. J. E. Verheyen*. Gent, 1959.
- BIANCHI, LUCY, and HIMMEL, ERIKA. "Indicios de Movilidad Social Vertical en los Estudiantes de la Universidad de Chile en 1960" (Evidence of Vertical Social Mobility in the Students of the University of Chile in 1960). *Boletín Estadístico de la Universidad de Chile*, Vol. 5, No. 2. Santiago: Editorial Universitaria, 1961.
- GRASSAU, ERIKA. "Análisis de Resultados de la Restricción de Matriculación y Selección de Alumnos en la Escuela de Medicina" (Analysis of Results of Enrollment Restriction and Selection of Students in the School of Medicine). *Boletín Estadístico de la Universidad de Chile*, Vol. 1, No. 1. Santiago: Editorial Universitaria, 1957. p. 64-70.
- GRASSAU, ERIKA. "Actividades a que se Dedicar los Estudiantes Secundarios Año y Medio Después de Haber Egresado" (Activities of Secondary Students a Year and a Half After Graduation). *Boletín Estadístico de la Universidad de Chile*, Vol. 2, No. 1. Santiago: Editorial Universitaria, 1958. p. 59-60. (a)
- GRASSAU, ERIKA. "Distribución de la Promoción Secundaria Egresada en 1957" (Distribution of Secondary-School Graduates in 1957). *Boletín Estadístico de la Universidad de Chile*, Vol. 2, No. 1. Santiago: Editorial Universitaria, 1958. p. 57-58. (b)
- GRASSAU, ERIKA, and ORELLANA, ECIDIO. "Desarrollo de la Educación Chilena Desde 1940" (Development of Chilean Education Since 1940). *Boletín Estadístico de la Universidad de Chile*, Vol. 3, No. 1. Santiago: Editorial Universitaria, 1959.
- GUTIERREZ, HECTOR. *Estimación de las Necesidades de Profesores en la Enseñanza Secundaria, Chile, 1957-1982* (Estimates of Teachers' Needs for Secondary Education in Chile, 1957-1982). Santiago: Centro Regional de Enseñanza e Investigaciones Demográficas en América Latina, 1960. (Mimeo.) (a)

- GUTIERREZ, HECTOR. *Proyección de los Alumnos Universitarios, Chile, 1957-1982* (Projection of University Enrollments in Chile, 1957-1982). Santiago: Centro Regional de Enseñanza e Investigaciones Demográficas en América Latina, 1960. (Mimeo.) (b)
- HAMUY, EDUARDO. *Educación Elemental, Analfabetismo y Desarrollo Económico* (Elementary Education, Illiteracy, and Economic Development). Santiago: Editorial Universitaria, 1960.
- INSTITUTO DE INVESTIGACIONES ESTADÍSTICAS. "Estadística del Bachillerato de 1959" (Statistics on the Baccalaureate Entrance Examination of 1959). *Boletín Estadístico de la Universidad de Chile*, Vol. 3, No. 1. Santiago: Editorial Universitaria, 1959.
- ORELLANA, EGIDIO. "El Crecimiento del Alumno de la Universidad de Chile Desde 1942" (Growth of Enrollment in the University of Chile Since 1942). *Boletín Estadístico de la Universidad de Chile*, Vol. 2, No. 1. Santiago: Editorial Universitaria, 1958.
- SALAS, IRMA, and ORELLANA, EGIDIO. *Correlación entre el Liceo y la Universidad* (Correlation Between the Secondary School and the University). Santiago: Editorial Universitaria, 1958.
- SUPERINTENDENCIA DE EDUCACIÓN. *Distribución de Alumnos por Edades y por Cursos* (Distribution of Enrollment by Age and Course). Santiago: Ministerio de Educación, 1959.
- SUPERINTENDENCIA DE EDUCACIÓN. *Bases Generales para el Planeamiento de la Educación Chilena* (General Bases for the Planning of Chilean Education). Santiago: Ministerio de Educación, 1961.
- VIEL, BENJAMIN, and ROJAS, PATRICIO. *Encuesta Socio-Económica de los Estudiantes de la Escuela de Medicina en 1958* (Socio-Economic Survey of Students of the School of Medicine in 1958). Santiago: Escuela de Medicina de la Universidad de Chile, 1959.
- VIEL, BENJAMIN, and OTHERS. *Análisis de Resultados de la Restricción de Matrícula y Selección de Alumnos* (Analysis of Results of Enrollment Restriction and Selection of Students). Santiago: Escuela de Medicina de la Universidad de Chile, 1956.

Peru—Modesto Rodríguez Montoya

MANY EDUCATIONAL investigations have been made in Peru; only those published since 1955 are reported in this chapter. Of the 18 reviewed, the greatest number are related to aspects of intellectual growth; others have to do with administrative aspects of the educational system, with vocational counseling, with reading and language problems, and with school achievement. Most of these investigations have taken place in the Instituto Psicopedagógico Nacional (National Psychopedagogical Institute) of the Ministry of Education and in the Instituto de Psicopedagogía (Institute of Psychopedagogics) of the faculty of education of the Universidad Nacional Mayor de San Marcos (National University of San Marcos). Both institutes have regular publications in which the results of investigations are reported.

Investigations Related to Intellectual Growth

Alarcón Napuri (1959-60) has standardized the General P.V. Intelligence Test of Theodore Simon for Peru. The test has been retained as in the original French version, except for a few changes in some of the items. Modifications have been introduced in the method of scoring to make it more simple. The standardization is based on 8461 school children, of whom 2995 were attending schools in the city of Lima and 5466 were from the provinces of Peru. Grade and mental-age norms have been developed. The distribution of IQ's for the Lima group shows a mean of 101.9 with a standard deviation of 20.9. Significant differences were observed between the results for Lima and those for the provinces, for which it is thought inconvenient to apply the Lima norms. Therefore, norms for each group have been developed.

Blumenfeld and Tapia Mendieta (1956) have summarized in one publication the results of a number of investigations on intellectual development and have published for Peru the adapted versions of the following tests: General P.V. Intelligence Test of Theodore Simon; *Terman Group Test of Mental Ability*, Lima revision; Test A-51; and Test Lima 1947. Blumenfeld and Tapia Mendieta (1957) have also summarized a number of investigations on the development of the capacity for critical analysis of the male students of primary and secondary education in Lima and of the capacity for reasoning in adolescents of both sexes in Lima and Tacna. In another publication, Blumenfeld and Tapia Mendieta (1958) have reported on the use of the *Goodenough Draw-a-Man Test*, *Kohs' Block-Design Test*, and the *Portens Maze Test* in different schools of Lima.

Izquierdo Pinedo (1959) has studied the problem of the development of the capacity for critical analysis of pupils in relation to school grade and chronological age. For this he used a test prepared by Blumenfeld that consists of right or true paragraphs; paragraphs with immediate or

directly apparent absurdities; contradictory paragraphs or paragraphs with near absurdities; and contradictory paragraphs or paragraphs with remote absurdities. The total number of subjects consisted of 613 pupils from grade 5 of elementary school to the fifth year of secondary education. Results of this investigation indicate that the capacity for critical analysis increases with school grade and that chronological age influences its development from 11 to 18 years.

Rodríguez Montoya (1955) has investigated the correlation between intelligence and achievement in the secondary schools. The study took place with groups of subjects ranging from 100 to 234 pupils of the second year of common secondary education in Lima who had taken the *Terman Group Test of Mental Ability*, Form B. The scores and the IQ's obtained were correlated with marks earned during the previous year or a year later in courses in mathematics, Spanish language, history of Peru, and biological sciences.

A low but significant correlation, higher than for all other subjects, was found for the Spanish language course; correlations for the history of Peru course were lower; while in mathematics, results were contradictory. Results also indicated that there were students with high mental ability who failed in their studies and others with low mental ability who succeeded. The contradictory results found between intelligence and achievement in mathematics indicated the necessity of investigating the maturity of the students, and the presence of types of abilities not found in the Terman test in relation to learning in that course.

Rodríguez Rivas and others (1959) gave Raven's *Progressive Matrices* test to 9181 subjects between the ages of 10 and 20 who attended from grade 3 of elementary school to the fifth year of secondary education. The standardization was effected with 6367 cases, of whom 3931 were male and 2436 female. In comparing the results for Arequipa with the norms developed for Colchester (England), it was noted that the scores for Colchester were higher than those for Arequipa. Results for male students were higher than those for female students, and these differences were highly significant during the adolescent period.

In a large-scale study conducted in Lima that involved more than 3000 male and female subjects in primary education, Alarcón Napuri (1959) found a substantial relationship between mean intelligence as measured by the General P.V. Intelligence Test and socioeconomic level of their families; he explained his findings in terms of environmental influences. Sex differences in which males were favored were found in the lower and middle socioeconomic groups but not in the group of the highest level. Marked variability in scores appeared in each of the groups.

Studies About School Achievement

At least four of the studies reported in this article are related to reading and language. Alarcón Napuri (1956) has investigated comprehension

and rate of silent reading in 568 pupils from the second to the sixth grade of elementary education in the public schools of Lima. He noted a modest relation between comprehension and age during the span from 10 to 13 years and a substantial degree of association between comprehension and grade level.

Concerning rate of reading, Romero Gomero (1959) conducted an investigation between the years 1954 and 1957 with 1521 subjects. The most important conclusions were (a) that there is progress in accordance with the school grade and (b) that the averages increase principally in the first three grades. Similar progress was noted in regard to chronological age. The increase in the averages was greatest for ages 7, 8, and 9, slight between ages 10 and 12, and insignificant for ages 13 and 14.

Coz Poma (1959) published a spelling syllabus for primary schools. In this study he tried to find out the currently misspelled words that should be set as goals for grades 3, 4, and 5 in elementary schools. Four lists of 100 words each were compiled from 4000 words taken from textbooks and notebooks of pupils attending grades 3-5 in primary schools. After pupils were asked to write these words, a count of errors was made in order to arrange the lists in ascending order of difficulty.

In the field of arithmetic Coz Poma (1961) made an investigation on achievement of students in the fourth and fifth grades of elementary education. The *Metropolitan Achievement Tests: Arithmetic*, with adaptations to the present courses of studies, was used. Results show that pupils have not adequately learned the fundamental operations involving fractions, mixed numbers, and decimals. Blumenfeld and Tapia Mendieta (1959) summarized various studies on the employment of arithmetic devices to facilitate the learning of algebra, on diagnosis of arithmetic computation, and on accuracy and speed of work in relation to chronological age and school grade.

Studies Related to School Administration

Various investigations have been made in this field with the purpose of solving problems of an administrative nature. The most important one was effected by the Ministry of Public Education (1958). Its report consists of four volumes with a total of 934 pages, in which the results of an inventory and survey of the educational conditions of the country were summarized to serve as a basis for the preparation of an educational development plan for Peru in the next few years. The national magnitude of this school survey required the cooperation of a great number of persons and institutions coordinated by the Ministry of Public Education. The Servicio Cooperativo Peruano-Norteamericano de Educación (Cooperative United States-Peru Educational Service) and the Instituto Psicopedagógico Nacional (National Psychopedagogical Institute) also rendered valuable assistance.

The areas of study were the following: (a) the pupils and the school enrollment, (b) the teachers, (c) the school work, (d) plans and programs of study, (e) school activities, (f) school materials, (g) school buildings, (h) school supervision, (i) cooperation between school and society, and (j) financing of education. Volume I contains a general view of the principal aspects of education in the country and detailed information about primary education. Volume II is devoted both to common secondary education and to secondary technical education (industrial and agricultural for boys). Volume III includes the complementary part of secondary technical education (industrial and commercial for girls) and information with respect to teacher training. Volume IV is devoted to physical education, special education, and art education.

Another survey of a national character made among all common secondary-school students of the entire country was reported by Gomez and others (1959-60), with data from 20,978 students attending schools in Lima, Callao, and Balnearios and 20,635 attending private schools. The aspects investigated referred to the student's home, means of transportation to school, school at which he studied the previous year, school at which he completed primary education, place of birth, chronological age, residence, and father's occupation. The data obtained gave valuable information for a better distribution of common secondary schools, for enlargement of existing ones, and for a redistribution of enrollment on the basis of district of residence.

School mortality rate has been investigated by Angles (1960) with data from a statistical inventory of the educational conditions of Peru. According to this study, of the total number of pupils who entered primary education in 1945 only 15.1 percent reached grade 5 and 5.6 percent the fifth year of secondary education (grade 11). The greatest mortality is registered in the transition between the first and second grades (47.57 percent) and between the second and third grades (31.72 percent) of primary education. With respect to the sexes, the greater mortality occurs in girls, especially in the elementary grades.

With the purpose of finding out whether it is advisable for primary-school students to complete the primary-school course in five or six years, Sardón Aliaga (1958) made a study of 1141 students attending the fifth year of secondary education who had completed the primary-school course in five or six years up to 1951. For this study he used the following criterion measures: (a) retention of students through the years of secondary education and the percentage of failures due to poor grades, (b) comparison of number of courses failed, and (c) comparison of percentages of students failing and percentages of students passing. Among the more important conclusions he made are the following: (a) The students who completed primary school in five years left in greater numbers and failed in greater proportion than those who had studied six years. (b) The same tendency was noticed in the number of courses failed and in the number of students failing during the first three years. (c)

However, in the last two years the trend reversed in favor of those students who had spent five years in primary education, apparently because of the operation of selection factors. The author considers that grade 6 of primary education is not indispensable, since students with five years did complete secondary education. It would appear that since it seems to retain a greater number of mediocre students, grade 6 should be obligatory for those who need to further develop their abilities.

Investigations on Vocational Counseling

In a large-scale investigation Coz Poma (1959-60) studied the vocational aspirations of secondary-school pupils in the metropolitan area of Lima. He used a questionnaire given to 15,995 students in the fifth year of secondary education. The pupils' ages ranged from 11 to 21 years for boys and from 11 to 23 years for girls. Of the male group, 94.2 percent showed their preference for 31 different occupations with the following having the greatest frequencies: (a) engineering, 26.9 percent; (b) medicine, 20.3 percent; and (c) militia, 15.8 percent. In the female group, 92.7 percent showed their preferences for 26 different occupations, the following being in order of frequency: (a) teaching, 22.8 percent; (b) pharmacy, 16.0 percent; (c) medicine, 14.6 percent; and (d) nursing, 10.6 percent.

Bibliography

- ALARCÓN NAPURI, REYNALDO. *Investigaciones sobre la Comprensión y la Rapidez en la Lectura* (Investigations on Comprehension and Rate of Reading). Lima, 1956. 42 p.
- ALARCÓN NAPURI, REYNALDO. "Relación Entre la Inteligencia y el Estado Socio-Económico de los Niños" (Relations Between Intelligence and Socio-Economic Status in Children). *Educación* (Universidad Nacional Mayor de San Marcos, Lima) 22: 111-32; 1959.
- ALARCÓN NAPURI, REYNALDO. "Revisión del Test Colectivo de Inteligencia P.V. de Th. Simon" (Revision of the Intelligence Group Test P.V. of Theodore Simon). *Boletín del Instituto Psicopedagógico Nacional* (Lima), años XIV-XV, Tomo I, Nos. 2-3: 29-52; 1959-60.
- ANGLES, CIPRIANO. "La Deserción Escolar y sus Causas Según el Inventario de la Realidad Educativa del Perú" (School Mortality and Its Causes According to the Educational Survey of Peru). *Educación* (Universidad Nacional Mayor de San Marcos, Lima) 23: 7-31; 1960.
- BLUMENFELD, WALTER, and TAPIA MENDIETA, MARIA VIOLETA. *Tests Colectivos de Inteligencia Verbal* (Group Verbal Intelligence Tests). Lima: Universidad Nacional Mayor de San Marcos, 1956. 76 p.
- BLUMENFELD, WALTER, and TAPIA MENDIETA, MARIA VIOLETA. *Estudios Experimentales Sobre el Razonamiento* (Experimental Studies on Reasoning). Lima: Universidad Nacional Mayor de San Marcos, 1957. 51 p.
- BLUMENFELD, WALTER and TAPIA MENDIETA, MARIA VIOLETA. *Investigaciones Sobre Tests de Inteligencia y Ciertos Aspectos de Ella* (Research on Intelligence Tests and Certain Aspects of Intelligence). Lima: Universidad Nacional Mayor de San Marcos, 1958. 78 p.
- BLUMENFELD, WALTER, and TAPIA MENDIETA, MARIA VIOLETA. *Didáctica Experimental, Reflexiones e Investigaciones*, No. 2, año 1959 (Experimental Didactics,

- Reflections and Investigations, No. 2, 1959). Lima: Universidad Nacional Mayor de San Marcos, 1959. 53 p.
- COZ POMA, FEDERICO A. *Syllabus de Ortografía para la Educación Primaria* (Spelling Syllabus for Elementary Education). Lima: Servicio Cooperativo Peruano-Norteamericano de Educación, 1959.
- COZ POMA, FEDERICO A. "La Aspiración Vocacional de los Alumnos de Educación Secundaria" (Vocational Aspiration of Secondary-School Students). *Boletín del Instituto Psicopedagógico Nacional* (Lima), años XIV-XV, Tomo I, Nos. 2-3: 78-83; 1959-60.
- COZ POMA, FEDERICO A. *Investigación Sobre el Rendimiento en Aritmética de los Alumnos del Cuarto y Quinto Años de Educación Primaria* (Investigation on Arithmetic Achievement of Fourth- and Fifth-Grade Elementary School Children). Lima, 1961.
- GOMEZ, CALDERON, and OTHERS. "Resultados de una Encuesta Aplicada a los Estudiantes de Educación Secundaria Común (Results of an Inquiry Made with Common Secondary-School Students). *Boletín del Instituto Psicopedagógico Nacional* (Lima), años XIV-XV, Tomo I, Nos. 2-3: 53-59; 1959-60.
- IZQUIERDO PINEDO, LUIS. *El Desarrollo de la Capacidad de Crítica de los Alumnos de Educación Primaria y Secundaria de Lima* (The Development of the Capacity for Critical Analysis in Primary- and Secondary-School Children of Lima). Lima: CIP, 1959. 96 p.
- MINISTERIO DE EDUCACIÓN PÚBLICA. *Inventario de la Realidad Educativa del Perú* (Survey of Education in Peru). Tomo I, 1957, 275 p. Tomo II, 1957, 158 p. Tomo III, 1957, 219 p. Tomo IV, 1958, 158 p.
- RODRÍGUEZ MONTOYA, MODESTO. "Correlación Entre la Inteligencia y el Rendimiento Escolar en Algunos Cursos Básicos" (Correlation Between Intelligence and School Achievement in Some Basic Courses). *Anales del Colegio de Doctores en Educación*: 183-87; 1955.
- RODRÍGUEZ RIVAS, MIGUEL, and OTHERS. "Estudio Experimental Acerca del Rendimiento de la Inteligencia de los Adolescentes de Arequipa, Mediante el Test de las Matrices Progresivas de Raven" (Experimental Study on the Intelligence Demonstrated by Arequipa Youth with Raven's Progressive Matrices Test). *Revista de Psicología*, Tomo I, No. 1: 63-140; 1959.
- ROMERO GOMERO, EMILIANO J. "Test de Rapidez de Lectura" (Rate of Reading Test). *Experiencia y Educación*, Tomo X, No. 5: 71-78; 1959.
- SARDÓN ALIAGA, MIGUEL A. "Influencia del Sexto Año de Primaria sobre los Estudios Secundarios" (Influence of the Sixth Grade of Primary School on Secondary Studies). *Boletín del Instituto Psicopedagógico Nacional*, año XIII, Tomo I, No. 1, 1958.

Puerto Rico—Miguelina N. Hernandez

WHEN THE Consejo Superior de Enseñanza (1956) (Superior Council on Education) was instrumental in the creation of a Division of Educational Research almost 16 years ago, there was little formal educational research being carried on in Puerto Rico. During its first decade of existence, the Division of Educational Research explored such educational problems as illiteracy and adult education, language arts in the elementary school, and scholastic achievement at the university level—activities that have been described by Rodriguez Bou (1957).

A few years later, in 1949, the Department of Education of Puerto Rico followed suit with the establishment of the Division of Educational Research and Statistics. During its initial six-year period, the Division of Educational Research and Statistics, conscious of the need for standardized measuring instruments and aware of its own need for experience with research methods and techniques, dedicated most of its effort to the adaptation of measuring instruments from English to Spanish for use in Puerto Rican schools. Rodriguez Bou (1957) has related efforts expended in the development of norms for Puerto Rican school children for such instruments as Form L of the *Revised Stanford-Binet Intelligence Scale*, the *Wechsler Intelligence Scale for Children*, the *Goodenough Draw-a-Man Test*, and the *Sims SCI Occupational Rating Scale*. Roca (1955) has pointed out the hurdles of this period that were encountered in adapting intelligence scales from one culture to another. Before the first six-year period was over, a vocational-interest inventory and a personality questionnaire were constructed.

Trends in Recent Research

The second five-year period, with which this report deals, has given ample evidence that a substantial amount of research has been undertaken. Early in 1958 the Division of Educational Research and Statistics in the Department of Education of Puerto Rico underwent administrative reorganization. The Division of Statistics became autonomous, and the research branch gave way to the establishment of the Office of Evaluation, in response to a growing critical concern on the part of government, educators, and parents over the quality of education that children were receiving in school. The main research emphasis in this period, at the Department of Education, has thus been given to the experimental investigation necessary to serve the purposes of a broad program geared to evaluate the outcomes of existing educational curricula and practices. As part of the experimental program that has been described in a volume from the Office of Evaluation of the Department of Education of Puerto Rico (1960), a general-ability test, at three different educational levels,

has already been constructed and published. In addition, efforts are being expended in the development of group nonverbal tests for children in grades 1, 2, and 3.

As a part of this emphasis on the evaluation of existing educational programs and practices, a study was conducted to determine the adequacy of the outcomes of the literacy-education program of the Department of Education (1959). This research program would appear to be unique since it represents perhaps the only attempt made anywhere to evaluate an adult-literacy program.

Another very basic and ambitious research project has been carried out by the Superior Council of the University of Puerto Rico during the past few years. It deals with an evaluation of the whole educational system of the island. Although completed, results are not yet available for publication.

The Measurement of Achievement

The objectives of evaluation necessarily demand the use of instruments that will give an objective measure of the extent to which school children are receiving the benefits of instruction. The Office of Evaluation of the Department of Education has started to construct achievement tests in the different subject-matter areas. One of the first attempts along this line was the construction of a measuring instrument to test children's proficiency in English, which is taught in the island as a preferred second language beginning in the first grade. Intended for children in grades 1, 2, and 3, the test consists of three parts (oral vocabulary, reading, and writing), which are described along with appropriate normative and standardization data in a manual prepared by the Office of Evaluation of the Department of Education (1961).

Another research project has dealt with the construction of a test to measure the basic skills involved in reading in the vernacular, for use in first, second, and third grades of the elementary school. The test, along with a manual, has been developed by the Departamento de Instrucción Pública (1961b, d), (Department of Public Instruction). In language arts, 'important research concerning word counts and regarding functional grammar in infants' oral language has been reported respectively in two different publications of the Consejo Superior de Enseñanza (1958, 1960), (Superior Council on Education).

Two recent studies conducted by the Departamento de Instrucción Pública (1961a, c), (Department of Public Instruction), have yielded as end products two measuring instruments in the field of mathematics. One is a test for children in grades 4, 5, and 6, which is intended to give an objective measure of the skills in the four fundamental arithmetic processes and of the ability to use these effectively in situations requiring reasoning. The second instrument is designed to measure achievement at the intermediate-school level (grades 7-9).

The Measurement of Personality

Three investigations published recently by three different individuals have to do with the nonintellectual aspects of personality.

In a pioneer attempt to describe the nature of the personality of teachers, Ramirez-Lopez (1959) carried out a comparative study of the values of teachers, students of education, and other college students at the University of Puerto Rico through use of an adapted form of the Allport-Vernon-Lindzey test, *Study of Values: A Scale for Measuring the Dominant Interests in Personality*. Teachers and students of education, at both the first-year and fourth-year levels, obtained their highest scores in theoretical and social areas, while students with no choice of vocation scored highest in theoretical, religious, and social areas.

The second investigation reported by M. Hernandez (1959) has yielded normative information on the needs and problems of high-school youth through use of a Spanish adaptation of the *SRA Youth Inventory*. Since this was the first study of its kind in the island, results revealed much about the nature of the problems reported by adolescents who attend high school. Findings indicated that boys' problems were significantly more intense in the areas of health and social adjustments than were those for girls. Moreover, in many of the areas measured, significant inverse relationships were found between socioeconomic level on one hand and frequency and intensity of the problems on the other. The most frequent and most intense problems of the sample seemed to center around perplexities dealing with vocational uncertainties of the future.

In a similar study, involving use of a translation and adaptation of the *SRA Youth Inventory*, C. Hernandez (1959) explored the problems of preadolescent and adolescent children in grades 4-7, ranging in age from 10 to 15 years, and provided (a) appropriate norms by grades and by sex and (b) percentile values. Comparisons of mean frequency of problems reported seemed to indicate that children coming from lower socioeconomic groups had a significantly higher number of problems regarding their health and their homes than the children in the higher socioeconomic groups. The study also included a very interesting crosscultural comparison in which scores obtained in the several personality areas were related to scores obtained by U.S. children who had taken the original English version of the *SRA Youth Inventory*.

Implications for the guidance process at the upper-elementary-school and intermediate-school levels would appear to be noteworthy.

Summary

During the past five years, educational research in Puerto Rico, as judged by the representative studies, can be viewed within the framework

of evaluation—evaluation in the very broad sense of the term. The most important trend seems to be appraisal and assessment.

The research conducted has yielded information which will be of incalculable aid in the evaluation of the educational process at all levels. It also has the merit, in most instances, of suggesting new research endeavors—especially those related to the development of a number of standardized tests for use in study of cognitive and affective processes of the learner.

Bibliography

- CONSEJO SUPERIOR DE ENSEÑANZA. *A Decade of Research at the Office of the Superior Council on Education*. Rio Piedras: University of Puerto Rico, 1956. 44 p.
- CONSEJO SUPERIOR DE ENSEÑANZA. *Recuento de Vocabulario de Revistas* (Magazines' Vocabulary Count). Rio Piedras: Universidad de Puerto Rico, 1958. 300 p.
- CONSEJO SUPERIOR DE ENSEÑANZA. *Funciones Gramaticales en el Habla Infantil* (Grammar Functions in Children's Talk). Rio Piedras: Universidad de Puerto Rico, 1960. 60 p.
- DEPARTMENT OF EDUCATION OF PUERTO RICO, OFFICE OF EVALUATION. *Evaluation of the Literacy Program*. San Juan: the Department, 1959. 98 p.
- DEPARTMENT OF EDUCATION OF PUERTO RICO, OFFICE OF EVALUATION (P. Roca, director). *Construction of a General Ability Group Test for Puerto Rican Students*. San Juan: the Department, 1960. 206 p.
- DEPARTMENT OF EDUCATION OF PUERTO RICO, OFFICE OF EVALUATION. *Manual for the Test of Basic Skills in English Primary Level, Grades 1, 2 and 3*. San Juan: the Department, 1961. 32 p.
- DEPARTAMENTO DE INSTRUCCIÓN PÚBLICA DE PUERTO RICO, OFICINA DE EVALUACIÓN. *Manual Técnico para la Prueba de Aprovechamiento en Matemáticas, Nivel Intermedio, Grados 7, 8 y 9* (Technical Manual for the Mathematics Achievement Test, Intermediate Level, Grades 7, 8 and 9). San Juan: Departamento de Instrucción, 1961. 23 p. (a)
- DEPARTAMENTO DE INSTRUCCIÓN PÚBLICA DE PUERTO RICO, OFICINA DE EVALUACIÓN. *Manual Técnico para la Prueba de Destrezas Básicas en Lectura, Nivel Primario, Grados 1, 2 y 3* (Technical Manual for the Reading Basic Skills Test, Primary Level, Grades 1, 2 and 3). San Juan: Departamento de Instrucción, 1961. 64 p. (b)
- DEPARTAMENTO DE INSTRUCCIÓN PÚBLICA DE PUERTO RICO, OFICINA DE EVALUACIÓN. *Manual Técnico para la Prueba de Destrezas Básicas y Razonamiento en Aritmética, Nivel Elemental, Grados 4, 5 y 6* (Technical Manual for the Arithmetic Basic Skills and Reasoning Test, Elementary Level, Grades 4, 5 and 6). San Juan: Departamento de Instrucción, 1961. 30 p. (c)
- DEPARTAMENTO DE INSTRUCCIÓN PÚBLICA DE PUERTO RICO, OFICINA DE EVALUACIÓN. *Prueba de Destrezas Básicas en Lectura, Nivel Primario, Grados 1, 2 y 3* (Reading Basic Skills Test, Primary Level, Grades 1, 2 and 3). San Juan: Departamento de Instrucción, 1961. 17 p. (d)
- HERNANDEZ, C. "Algunas Características del Adolescente Boricua" (Some Characteristics of the Puerto Rican Adolescent). *Revista de Ciencias Sociales de la Universidad de Puerto Rico* 3: 201-28; June 1959.
- HERNANDEZ, MIGUELINA. "Necesidades de los Estudiantes de Escuela Superior: La Vocación y el Futuro" (Needs of High-School Students: Vocation and the Future). *Revista de la Asociación de Maestros de Puerto Rico* 16: 1; June 1959.
- RAMIREZ-LOPEZ, R. "Estudio Axiológico" (Axiological Study). *Pedagogía* (Universidad de Puerto Rico) 7: 7-20; June 1959.
- RODRIGUEZ BOU, ISMAEL. "Latin-American Countries: Brazil, Costa Rica, Ecuador, Panama, Puerto Rico. Section C: Puerto Rico." *Review of Educational Research* 27: 111-18; February 1957.
- ROCA, PABLO. *Problems of Adapting Intelligence Scales from One Culture to Another*. San Juan: Department of Education, 1955. 15 p.

CHAPTER IV

Japan

ARATA YODA and TADASHI HIDANO

FOR THE PURPOSES of this chapter, more than 150 studies of educational research were selected from various Japanese journals and other sources. Especially important were such journals as the *Japanese Journal of Educational Psychology*, the *Japanese Journal of Psychology*, the *Japanese Journal of Education*, and bulletins issued by several colleges and institutes in the past five years. These studies are presented and discussed under 12 major headings: developmental studies, teaching methods, group dynamics, special education, evaluation of achievement, intelligence tests, personality tests, problem children, adolescence, mass media, the teaching-learning process, and parent-child relationships.

Developmental Studies

There were a number of descriptive studies on the nature and influence of kindergarten education, including several investigations on the adjustment problems of kindergarten children (Bando, 1959; Nakanishi and others, 1958-59; Ushijima and Nagatsuka, 1958). One study focused on the language development of school children (National Language Research Institute, 1957-59), and two others dealt with the development of children's thinking in the actual classroom situation (Shigematsu and others, 1955-61, 1957). The study at the National Language Research Institute and the Shigematsu studies were carried out on a large scale over a period of more than six years. The former study involved the use of tests, observations, questionnaires, and experiments covering many different aspects of speech activity, including the general development of language ability and the factors determining the nature and course of that development. The Shigematsu studies were noteworthy because of their introduction of new research methods into the study of children's thinking.

Other developmental studies of interest concerned children's thinking and perception (Kondo, 1958; Ogura and others, 1960; Séki, 1959), the social behavior of children (Ishiguro and others, 1958; Nakanishi, 1959b; Yoneyama, 1958), and intellectually gifted children (S. Mori, 1959).

Teaching Methods

It is only recently that experimental studies have been conducted relating to methods of teaching school subjects. Some of these studies sought

the causes of academic failure (Miyoshi and Koura, 1959; Nakano, 1960; Sawada and others, 1959; Tsudzuki and others, 1959); others attempted to evaluate various methods and techniques of teaching (Hidano and Ito, 1961; Ito, 1961; Nagahama, 1960; Nagasawa, 1961; Takano, 1957-59); and still others considered some of the correlates of success in different academic subjects (Kawai, Kuraishi, and Umemoto, 1959; Kuraishi and others, 1959; Sawada and others, 1960; Shirai, Sasayama, and Kawanishi, 1958).

Under this heading should also be mentioned those studies dealing with analysis of textbooks (Yoshida, 1959), analysis of educational objectives (Ohnishi, 1960), aptitude and readiness factors in learning (Matsubara, 1959; Sawada and others, 1961), evaluation of achievement (Haga, 1960; Masuda and others, 1959), relationship between socioeconomic conditions and scholastic attainment (Matsumoto and others, 1959; Miyake and Kido, 1959), and foreign language competency (Obonai and Nagasawa, 1957, 1960). Such studies have served to establish a more scientific basis for curriculum study and evaluation and have encouraged further examination of the teacher's ability to provide adequate teaching and guidance.

Group Dynamics in the Classroom

Studies on the problems and dynamics of the class as a group have been strongly influenced in Japan by the group dynamics movement in the United States. The studies of classroom atmosphere by Misumi, Nakano, and Ueno (1959) and by Misumi and Nakano (1960a, b) are among the most important studies in this area. Kitano's study (1958) on friendship patterns in multiple-grade classrooms as opposed to single-grade classrooms should prove to be useful in class management. Kishida (1958, 1959) studied the conditions which influence children's attitudes toward teachers and their problems of adjusting to teachers. The only major studies on leadership were conducted by Kobayashi and Saito (1958) and Mizuhara and others (1960), who studied the leadership function in children's groups and among college students. In addition, Nishiyama (1959a, b) studied small groups to determine the influence of group discussion on decision making.

Special Education

Research studies in special education are subdivided into those referring to research on the blind, the deaf, and the mentally retarded child.

Studies on Blind Children

There were a number of studies on the measurement of intelligence in the blind. Sakakibara (1955) analyzed the verbal subtests of the *Wechsler*

Intelligence Scale for Children and demonstrated the suitability of those subtests for blind children; he now plans to standardize these subtests for use with the blind. Y. Sato (1959) studied achievement tests and a social-maturity scale for the purpose of standardizing a social-development test for the blind.

Studies on Deaf Children

Several studies have also been undertaken on the measurement of intelligence in deaf children (Hayashi, 1958; Mishima and Hattori, 1957; Togawa, Mishima, and Asai, 1958). Hayashi, influenced by M. S. Hiskey's test, developed an intelligence test which makes use of pantomime. Mishima and Hattori developed a test which requires the deaf child to draw on his answer sheet a pattern of 10 dots which is projected on a screen. Togawa and others then refined this technique into the Dots Pattern Test. Arakawa (1954) has studied the structure of sentences written by the deaf; Suhara and Hoshi (1957) have prepared a report on the pure-tone audiometry of deaf children; and Nakamura (1957) has studied personality rigidity in deaf children.

Studies on Mentally Retarded Children

Some recent investigations have attempted to classify mentally retarded children in terms of etiology, associated behavioral characteristics, and degree of educability. Efforts have also been made to discover suitable educational methods to be used with each of the groups so classified. Unfortunately, the results of these investigations have not yet been published. However, Miki (1960) made surveys on the intelligence, social maturity, character, and scholastic achievement of 1947 mentally retarded children in elementary school and 592 in junior high school. From these surveys it is possible to describe some of the characteristics of mentally retarded children and to develop fruitful suggestions about better methods of educating mentally retarded children. Masaki (1959) made a follow-up study on the personality development of the mentally retarded persons in special institutions.

Evaluation of Achievement and the Entrance Examination

Recent studies on the evaluation of achievement have focused on such problems as the analysis of the environmental conditions that influence scholastic achievement, including physical isolation (Amano, 1958) and educational upheaval resulting from typhoon damage (Shioda and others, 1961); the study of the relationship between study habits, attitudes toward

study, and achievement (Matsushita, 1959); an evaluation of the influence of testing on the learning of school subjects (Hashimoto, 1959b); and a comparison of performance on announced and unannounced tests (Hashimoto, 1959a).

Entrance examinations constitute one of the most important educational problems in Japan. The postwar reformation of the educational system brought a rapid increase in the number of high-school pupils. In 1956 their number had increased to 756,000, but lack of facilities prevented the colleges and universities from accepting more than 123,500 students. Consequently, the competition for university admission has become more rigorous; and, in 1956, 55,000 high-school graduates attended special preparatory schools after they had failed the college entrance examinations.

Extensive studies of entrance examinations for institutions of higher education have been made by Kyoto University (1958) and the National Institute for Educational Research (Nishibori, Matsushita, and Shibuya, 1961; Nishibori and Shibuya, 1960; Nishibori and others, 1955, 1958). A group of educators, psychologists, and sociologists in Kyoto University used the questionnaire method to study the opinions of high-school students, preparatory-school students, college students, and parents about procedures for university admission. The results indicated that in spite of the stiff competition, most respondents supported the present system of college admission based on achievement-test results and that few preferred the scholastic-aptitude test which was administered for eight years after World War II (Kyoto University, 1958).

In a study conducted at the National Institute for Educational Research, it was found that the best predictors of college achievement were, in order, high-school grades, achievement tests given at time of admission, and scholastic-aptitude tests given at time of admission (Nishibori, Matsushita, and Shibuya, 1961). In this same study it was also found that college students who were admitted immediately after high-school graduation achieved at a higher level than those who had failed the entrance examinations at least once and then later passed. There were also many studies of high-school entrance examinations (Hatta, 1961; New Education Study Group, 1957) and of their value in predicting achievement in high school (Nekadake, 1957; Tsudzuki, 1957a, b; Tsudzuki and Masuda, 1958).

Intelligence and Intelligence Tests

Recent studies of intelligence and intelligence testing have included longitudinal and cross-sectional studies of intellectual development (Kano and others, 1957; Nakadake and Yamamoto, 1958; Nakahara, 1959; Sawa, 1957), factor-analytical studies of the structure of intelligence (Iwata, 1958; Kawasaki, 1958; Sawa, 1958; Sumida, 1961), studies of the relationship between intelligence and achievement (Matsuoka, 1958; Ogata, 1958), and studies of the relationship between intelligence and physical

measures (Sawada, 1959, 1960). Also studied were problems related to such methodological considerations as the influence of the examiner's personality on test performance (T. Sato, 1959); the influence of test form (verbal, nonverbal, group-individual) on the performance of different groups (Amano, 1958; Egawa, 1958); and the standardization procedures employed in the development of intelligence tests for handicapped children and particularly for deaf children (Hayashi, 1958; Mishima and Hattori, 1957).

The studies showing the greatest numerical increases recently were the longitudinal and factor-analytical studies. One such longitudinal study was conducted on a large scale by Nagoya University; it investigated the predictive efficacy of various psychological tests, including intelligence tests, which were administered in the junior and senior high schools (Nakadake and Yamamoto, 1958). Another study, conducted by the Institute for Science of Labor and employing the Stanford-Binet scale as its principal measure, traced the mental development of children over a nine-year period (Kano and others, 1957).

Personality Tests and Projective Techniques

In Japan there seem to be two main trends in the area of personality tests and projective techniques at the present time: (a) the construction and standardization of new tests for the Japanese population and (b) the application of tests developed in the United States.

In the first category would come recent efforts to develop and standardize a personality test for children (Ushijima and Yamakawa, 1958); a personality test for adults (Kano, 1958a, b); a sentence-completion test and a picture-frustration test for juvenile delinquents (Bannai, 1957; Katsurajima, 1957); and a picture-frustration test to discover problem children in the classroom (Takahashi, 1960). The latter test, a measure of the subject's adaptability to different situations, should prove of considerable value in the study of adjustment and moral education. It consists of six separate subtests, one of which is a measure of inferiority feelings. Additional reliability data are needed for this and other subtests in the battery.

Attempts to use tests developed in the United States have included the use of the *Thematic Apperception Test* and sentence-completion tests to study the needs, emotional tone, and aggressive behavior of children and adults in Japan (Akamatsu and others, 1959; Marui, 1960; Takahashi, 1960).

Problem Children and Delinquents

There have been some studies on teachers' attitudes toward problem children in the classroom. Kondo, Emi, and Suzuki (1961), for example,

reported that teachers generally did not show much interest in problem pupils. K. Ogawa (1958) found distinct differences in classroom atmosphere between classrooms with teachers who considered regressive behavior as a very serious problem and those with teachers who were more concerned about problems of aggressive behavior. The former classrooms evidenced greater friendliness and cooperation and better teacher-pupil relations.

Problems related to juvenile delinquency have been studied by Kudo (1957), who considered the hostility of juvenile delinquents from various points of view, and by Abe, Horiuchi, and Murakami (1957), who inquired into delinquency from a sociopsychological framework which emphasized the relationship of the delinquent's problems to his socio-historical background.

Adolescence

Most of the studies on adolescence during the past five years have been surveys and studies on the development of the self-concept or on the formation of moral attitudes in adolescence. Saito (1958), Kato and Sorita (1961), and Yoshikawa (1960) all conducted studies on the psychological characteristics of adolescents, with particular reference to the development of the self-concept. Saito concentrated on the study of the processes by which subjective and objective points of view develop, while Yoshikawa focused on self-acceptance as an aspect of self-concept formation. Many other studies too numerous to mention here have employed the questionnaire method to secure data from adolescents on such topics as coeducation, relations with the opposite sex, and sex education, as well as on the topics previously mentioned.

Mass Media

With the rapid increase in the number of TV sets in Japanese homes in recent years, many research agencies have turned their attention to the influence of this mass medium on Japan's younger generation. Most of these studies have centered upon the amount of TV viewing done by children, the influence of TV viewing on the general structure of their leisure-time activities, and the effect of such viewing on character formation. Two of the large-scale surveys on the effects of TV viewing were conducted by the Ministry of Education (1958, 1959) and by the NHK Radio and TV Culture Research Institute (1960) in the Shizuoka Prefecture. The latter survey distinguished the TV viewers from the non-TV viewers and compared their responses on questionnaires and other instruments. Also included in the study was a content analysis of favorite programs. Another study (F. Mori, 1960) used the GSR index to analyze the emotional reactions of people watching television and movies.

The Teaching-Learning Process

The study of the teaching-learning process in the classroom is one of the most important problems in educational research. However, it is only recently in Japan that the process has been studied empirically and objectively. The first attempt to analyze communication and interaction between children and teachers in the classroom was made by Kihara (1958). He used two procedures to analyze the interaction processes. With the first procedure the instructional activities of the teacher were recorded every 30 seconds and classified in the following terms: (a) whether they were teacher centered, child centered, or group centered; (b) whether they were subject-matter centered or "life" centered; (c) whether they involved teacher indoctrination of values or encouragement of students to develop their own value systems; (d) whether the teacher inspired his children or adopted a punitive attitude; and (e) whether the teacher gave evidence of emotional stability. The second procedure was aimed more directly at teacher-pupil relationships; observed interactions were classified in terms of whether they involved an answer to a teacher's question, no answer to a question, an answer without a question, evidence of approval, evidence of rejection, teacher warning, and so on.

Ogawa, Kihara, and Fukaya (1959) and Ogawa, Kihara, and Yamada (1960) used somewhat similar methods in analyzing the teaching-learning process. One of their procedures was derived from the second procedure described above. The other involved a system of coding the explicit nature of the interaction processes observed and the identity of the participants. They found, among other things, that active participants in the teaching-learning process typically performed better on examinations and that certain patterns of communication and interaction generally resulted in more effective learning by pupils.

The above-mentioned studies were conducted by educational sociologists; noteworthy also are the studies of the teaching-learning process conducted by educators and school teachers. These studies were more concerned with the development of the thought processes than with the communication or interaction processes in the classroom. The research method proposed by Shigematsu, who is a pioneer in this field, was different from that of Kihara and others; it has been employed in many different investigations (T. Ogawa, 1959; Shigematsu and others, 1955-61; Toyama-City Horikawa Elementary School, 1959). Shigematsu divided classroom teaching into several stages of learning and then analyzed the development of the processes of thinking and understanding of children at each stage. His study at the Horikawa Elementary School was based on precise records of children's activities in the classroom by 40 observers. His study at Hikari Elementary School compared children who had been divided according to different types of thought processes in terms of their reactions to the teacher's questions. Both studies had many practical implications for the classroom setting.

Sunazawa (1959) and Sunazawa and Suzuki (1960) recorded the teaching-learning process in detail and tried to discover the principles governing children's thought processes, particularly comprehension. They classified communication in the classroom into four major types: (a) simple question-answer type; (b) successive-answer type, involving successive answers by children to the teacher's single question; (c) circulation type, involving the circulation of questions and answers to refine and improve children's understanding; (d) summarization, intended to give definitive information and immediate closure about a given concept. They also examined the relationships between the method of instruction and the observed types of communication. Another study of the teaching-learning process (Saeki, 1961) contained reports of children's activities and thought processes and analyses of types of communication in the classroom. This study considered the effect of the different types of teacher questions on student response and made analyses of the number of hands raised in response to different teacher questions. The other analyses made were very similar to those in the Sunazawa study.

Parent-Child Relationships and Children's Personality Formation

Since 1952 there have been many studies of parent-child relationships and the personality formation of children. There were nearly 50 during the past five years, and it is interesting that many of these were concerned with problems of methodology (Onishi, 1958). Nakanishi and others (1958-59) have been studying such methodological problems since 1953 and have criticized the vagueness of the variables and systems of categorization devised by investigators in this area, each of whom seems to develop his own personal system based upon a set of highly hypothetical assumptions. In a study of his own, Nakanishi (1959a) applied factor-analytical procedures in an effort to arrive at empirically defined categories that would be useful in developing questionnaires and observation schedules. Data were obtained from interviews with 80 mothers. The factor analysis revealed four major factors, identified as authoritarian discipline, sibling disharmony, permissiveness, and babying. Higashi (1959) measured the attitudes of children toward their mothers and studied the problems of psychological weaning. He administered questionnaires to 1000 children in grades 3-12 and asked their reactions toward their mothers in various situations. These data were also subjected to factor analysis, and three factors emerged: independent *versus* dependent, affectionate *versus* cold, and secure *versus* ambivalent. Factor scores were then computed from each factor and related to other variables. It was found that the independence-factor score was positively related to grades and that the average score was higher for boys than for girls. It was also found that the affection-factor score was negatively related to grades and that the average score

was higher for children from farm families than for children whose fathers pursued other occupations.

Yoda and Kuze (1957, 1958, 1959) used questionnaires to study the problem of psychological weaning in adolescence. Approximately 1000 junior and senior high-school students were asked whose advice they considered most valuable when they had to choose a vocation and with whom they wanted to consult when they encountered difficulties with future plans. The emotional attitudes of adolescents toward their parents were also examined. The results showed that in the period from the third year in junior high school to the first year in senior high school the attitudes of adolescents changed markedly, with a stronger and stronger tendency for them to think it best to decide for themselves and to carry out their own intentions. However, the results also showed that parents were still regarded as good advisers when adolescents encountered actual occupational problems of one kind or another.

Parent-child relationships have also been investigated energetically by the members of the Department of Educational Psychology of Nagoya University since 1955. They have studied the problems of parental expectations and their influence on children's motivation and personality structure (Shioda and others, 1957), family egoism (Tsudzuki, 1957-59), differences between parents and children in their attitudes toward the feudalistic family (Akagi, 1958), sibling relations (Shioda and Ohashi, 1958, 1959), the relationship between social status and parent-child relations (Tsudzuki and Masuda, 1959, 1960), and parent-child relations characteristic of junior high-school pupils growing up in rural communities (Kondo, Ota, and Hayashi, 1959, 1960).

Onishi (1958) and Onishi and others (1957) observed the behavior of children in nursery school and classified that behavior in terms of three major categories: (a) the ascendant type, or any behavior involving an effort to be superior to or dominant toward other children; (b) the "levelling" type, or any behavior motivated by a desire to be at the same level with others, but neither higher nor lower; and (c) the submissive type, in which the child effects a subordinate relationship with others. They also examined the relationships between the above characteristics and the mothers' child-rearing attitudes, the latter including such variables as strictness, indulgence, laissez-faire tendencies, and consistency. Information about these variables was secured by means of both interviews and questionnaires, but the interviewing technique was found to be more reliable than the questionnaire.

Tsumori and Inage (1958) pointed out that most studies concerning parental attitudes and practices with regard to the nursing of babies had depended exclusively on the past memories of parents whose children were already in early childhood. They emphasized the necessity of studying the attitudes of parents whose babies were at the nursing stage at the time of the investigation. In their own study they corrected this situation by interviewing 120 parents with babies aged 2-12 months at the time of the

interview. They discerned two types of parental attitudes, with some mothers having very frequent contacts with their babies and exhibiting tolerant attitudes, while others had less frequent contacts with their babies and exhibited greater strictness in their relationships with them. The psychological development of babies nursed by mothers with tolerant attitudes appeared to be superior to that of babies whose mothers had adopted the stricter attitudes. Tsumori and Inage (1960) studied the relationship between the attitudes of parents toward nursing and the psychological dependency of their children, reporting the existence of wide individual differences in dependency which did indeed seem to be related to the parents' attitudes toward nursing.

In an attempt to study the factors which influence personality formation, Yoda and others (1961) developed a scale to measure the dependent behavior of children. This scale was based upon data secured from questionnaires answered by mothers of nursery-school children. They studied the correlations between the scores obtained on the scale and such factors as the social, cultural, and economic conditions of the family, the child's position in the family, the patterns of living within the family, and parental attitudes. The results suggested that the opportunity for the exercise of complete freedom on occasion and the presence of siblings in the environment were both necessary factors for the optimum development of psychological independence in children.

Bibliography

- ABE, J.; HORIUCHI, Y.; and MURAKAMI, S. "A Social Psychological Approach to the Conditions of Delinquency: Especially from the Historical Point of View." *Bulletin of Tohoku Kyosei Kagaku Kenkyu-jo*, No. 2, 1957.
- AKAGI, A. "Feudalism in Family: 1—Attitude Toward the Feudalistic Family." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 4, 1958.
- AKAMATSU, H., and OTHERS. "A Study of the Picture-Frustration Test." *Bulletin of Osaka City Institute for Educational Research*, No. 40, 1959.
- AMANO, M. "A Study of Factors in Differences in Achievement Between Two Schools in Isolated Villages." *Japanese Journal of Educational Psychology*, Vol. 5, No. 2, 1958.
- ARAKAWA, I. "Deaf Pupils' Ability To Use Auxiliary Words and Verbs." *Japanese Journal of Educational Psychology*, Vol. 2, No. 1, 1954.
- BANDO, Y. "A Psychological Study on Fatigue of New School Children." *Journal of Hokkaido Gakugei University*, Sect. A, Vol. 10, No. 1, 1959.
- BANNAI, K. "Study of the Picture-Frustration Test (3): A Comparison of the Test for Adults with That for Children." *Bulletin of Tohoku Kyosei Kagaku Kenkyu-jo*, No. 2, 1957.
- EGAWA, R. "A Study on Environmental Handicaps in Intelligence Test Performance Among Urban and Rural Children by Means of the Suzuki-Binet Scale." *Japanese Journal of Educational Psychology*, Vol. 6, No. 1, 1958.
- HAGA, J. "A Study of the Construction of an English Aural Comprehension Test for Third Grade Middle School Students." *Japanese Journal of Educational Psychology*, Vol. 8, No. 2, 1960.
- HASHIMOTO, J. "The Effect of Announcement of the Coming Test." *Japanese Journal of Educational Psychology*, Vol. 6, No. 4, 1959. (a)
- HASHIMOTO, J. "Influences of Testing Learned Material to Its Relearning." *Japanese Journal of Educational Psychology*, Vol. 7, No. 2, 1959. (b)

- HATTA, S. "How Do the Teacher and the Pupils Stumble in Lessons?—Some Results from Teaching-Learning Process Analysis." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 7, 1961.
- HAYASHI, S. "Intelligence Test for Deaf Children." *Japanese Journal of Educational Psychology*, Vol. 5, No. 2, 1958.
- HIDANO, T., and ITO, R. "An Experimental Study on the Promotion of Reading Rate." *Japanese Journal of Educational Psychology*, Vol. 9, No. 1, 1961.
- HIGASHI, S. "Psychological Study of the Parent-Child Relationship—Especially on the Process of Psychological Weaning." *Educational Studies, Faculty of Education, Hiroshima University*, Part I, Vol. 7, 1959.
- ISHIGURO, T., and OTHERS. "Development of Infantile Social Behavior—Relationships Between Infantile Social Behavior and Family Background." *Bulletin of Nihon Hukusi Daigaku*, No. 2, 1958.
- ITO, Y. "'Science Experiments' Through Audio-Visual Methods." *Educational Studies, Faculty of Education, Hiroshima University*, Part I, Vol. 9, 1961.
- IWATA, S. "Comparative Factorial Analysis of Intelligence for Different Achievement Levels." *Bulletin of Utsunomiya University*, No. 7, 1958.
- KANO, H. "On the Standardization of the 'Roken Personality Test.'" *Journal of Science of Labour*, Vol. 34, No. 11, 1958. (a)
- KANO, H. "On the Reliability and Validity of the 'Roken Personality Test.'" *Journal of Science of Labour*, Vol. 34, No. 12, 1958. (b)
- KANO, H., and OTHERS. "Studies on the Mental Development of Children Through Nine Years." *Journal of Science of Labour*, Vol. 33, No. 10-11, 1957.
- KATO, T., and SORITA, T. "A Study on the Self, Ideal Self, and Ideal Opposite Sex Concept of the Adolescent." *Japanese Journal of Educational Psychology*, Vol. 9, No. 1, 1961.
- KATSURAJIMA, M. "The Study of Projective Technique: (2) A Sentence Completion Test." *Bulletin of Tohoku Kyosei Kagaku Kenkyu-jo*, No. 2, 1957.
- KAWAI, H.; KURASHI, S.; and UMEMOTO, T. "Psychological Studies on Learning of School Subjects: II—Rorschach Analysis on the Personalities of Pupils Having No Aptitude for Mathematics." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959.
- KAWASAKI, H. "Functional Analysis of Intelligence Factors." *Bulletin of the Faculty of Liberal Arts and Education, Nagasaki University*, Vol. 3, 1957. Vol. 4, 1958.
- KIHARA, K. *Analysis and Diagnosis of the Teaching-Learning Process*. Tokyo: Seishin Shobo, 1958.
- KISHIDA, M. "A Study on the Human Relationship Between Pupil and Teacher: I—With Special Emphasis on the Adjustment of Pupil Toward Teacher." *Japanese Journal of Educational Psychology*, Vol. 5, No. 2, 1958.
- KISHIDA, M. "A Study on the Human Relationship Between Pupil and Teacher: II—With Special Emphasis on the Effects of Teachers' Conditions upon the Pupils' Attitude Toward Them." *Japanese Journal of Educational Psychology*, Vol. 7, No. 2, 1959.
- KITANO, E. "On the Effect of Class Organization upon Friendship and Group Learning." *Japanese Journal of Educational Psychology*, Vol. 5, No. 4, 1958.
- KOBAYASHI, S., and SAITO, M. "An Experimental Study of Leadership Function* in Young Children's Groups." *Japanese Journal of Educational Psychology*, Vol. 5, No. 4, 1958.
- KONDO, S.; EMI, Y.; and SUZUKI, K. "The Attitudes of Teachers Toward Problem Pupils." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 7, 1961.
- KONDO, S.; OTA, M.; and HAYASHI, H. "Relationship of Junior High-School Pupil with His Family in a Rural Community (1), (2)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 5, 1959. Vol. 6, 1960.
- KONDO, T. "The Development of Children's Understanding of Causal Relations." *Japanese Journal of Educational Psychology*, Vol. 5, No. 2, 1958.
- KUDO, S. "Relationship Between Manifest Hostility and Delinquent Personality." *Bulletin of the Faculty of Art and Science, Fukushima University*, No. 8, Part III, 1957.
- KURASHI, S., and OTHERS. "Psychological Studies on Learning of School Subjects: I—Developmental Study on the Relations Between Achievement in Arithmetic and Intelligence Factor." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959.

- KYOTO UNIVERSITY FACULTY OF EDUCATION. "A Cooperative Study of the College Entrance Examinations." *Kyoto University Research Studies in Education*, Vol. 4, 1958.
- MARUI, F. "A Normative Study on TAT—Chiefly on Emotional Tone, Outcome and Shift." *Japanese Journal of Psychology*, Vol. 31, No. 2, 1960.
- MASAKI, M. "A Study of Personality Development in Mental Deficiency." *Bulletin of the Faculty of Education, Kyoto University*, No. 5, 1959.
- MASUDA, K., and OTHERS. "Psychological Studies on Learning of School Subjects: X—Educational Psychological Study of Teaching Methods of Vocation as a Subject of Secondary School." *Japanese Journal of Educational Psychology*, Vol. 7, No. 3, 1959.
- MATSUBARA, T. "An Experimental Study on Readiness—For Multiplication Facts." *Japanese Journal of Educational Psychology*, Vol. 7, No. 3, 1959.
- MATSUMOTO, K., and OTHERS. "Psychological Studies on Learning of School Subjects: VII—A Psychological Study on the Methods of Science Teaching in Elementary School." *Japanese Journal of Educational Psychology*, Vol. 7, No. 1, 1959.
- MATSUOKA, S. "Study on the Structure of Intelligence in Children (1), (2)." *Bulletin of the Faculty of Liberal Arts and Education, Nagasaki University*, Vol. 4, 1958.
- MATSUSHITA, S. "A Study of Some Factors of the Study Habits and Study Attitudes of College Students." *Journal of Hokkaido Gakugei University*, Vol. 10, 1959.
- MIKI, Y., editor. *Survey of Mental Deficiency in Japan*. Tokyo: Tokyo-Daigaku Shuppan-Kai, 1956, 1960.
- MINISTRY OF EDUCATION. *A Survey of the Effect of TV*. Tokyo: the Ministry, 1958.
- MINISTRY OF EDUCATION. *A Survey of the Effect of TV*. Tokyo: the Ministry, 1959.
- MISHIMA, J., and HATTORI, H. "An Experimental Study on the Intelligence Measurement of Deafs." *Japanese Journal of Educational Psychology*, Vol. 5, No. 1, 1957.
- MISUMI, J., and NAKANO, S. "A Cross-Cultural Study of the Effect of Democratic, Authoritarian and Laissez-Faire Atmospheres in Children's Groups (II)." *Japanese Journal of Educational and Social Psychology*, Vol. 1, No. 1, 1960. (a)
- MISUMI, J., and NAKANO, S. "A Cross-Cultural Study of the Effect of Democratic, Authoritarian and Laissez-Faire Atmospheres in Children's Groups (III)." *Japanese Journal of Educational and Social Psychology*, Vol. 1, No. 2, 1960. (b)
- MISUMI, J.; NAKANO, S.; and UENO, Y. "A Cross-Cultural Study of the Effect of Democratic, Authoritarian and Laissez-Faire Atmospheres in Children's Groups (I)." *Research Bulletin, Faculty of Education, Kyushu University*, Vol. 5, 1959.
- MIYAKE, K., and KIDO, M. "Psychological Studies on Learning of School Subjects: V—Psychological Approach to Curriculum Reconstruction of Social Studies Concerning the Problem of Retarded Children." *Japanese Journal of Educational Psychology*, Vol. 6, No. 4, 1959.
- MIYOSHI, M., and KOURA, I. "Psychological Studies on Learning of School Subjects: III—Children of Inferior Ability in Learning the Japanese Language." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959.
- MIZUHARA, T., and OTHERS. "An Experiment in Leadership Training." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 6, 1960.
- MORI, F. "An Examination of the Measurement of the Group G.S.R. When Each Subject Is Looking at Television." *Japanese Journal of Educational Psychology*, Vol. 8, No. 3-4, 1960.
- MORI, S. "Basic Study on the Characteristics of Intellectually Gifted Children: I—General Developmental Characteristics." *Japanese Journal of Educational Psychology*, Vol. 7, No. 3, 1959.
- NAGAHAMA, K. "Study of Transfer in Science Education: 1—Consideration of the Establishment of Experimental Method in the Study of Transfer of Scientific Thinking." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 6, 1960.
- NAGASAWA, K. "Psychological Study of Learning English: 6—Teaching of Fries' Sentence Patterns by the Group Formation." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 7, 1961.
- NAKADAKE, O. "Study on the Prediction of Achievement—The Structure of School Attainments with Respect to Psychological Measurement." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957.
- NAKADAKE, O., and YAMAMOTO, T. "Follow-Up Studies on the Predictability of Instruments for Diagnosis of Educational Psychology—The Intelligence Test." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 4, 1958.

- NAKAHARA, H. "Experimental Study on Intelligence." *Bulletin of Educational Faculty of Ibaraki University*, No. 9, 1959.
- NAKAMURA, S. "Studies of Deaf Children—Rigidity of Personality and Degree of Müller-Lyer's Illusion." *Japanese Journal of Educational Psychology*, Vol. 4, No. 3, 1957.
- NAKANISHI, N. "Psychological Study of Parent-Child Relationships: 8—A Factor-Analytic Study of Parental Attitudes." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959. (a)
- NAKANISHI, N. "A Study of Development of Resistant Behavior." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959. (b)
- NAKANISHI, N., and OTHERS. "Study on Effects of Kindergarten Attendance (I, II)." *Reports of the Science of Living, Faculty of the Science of Living, Osaka City University*, Vol. 6-7, 1958-59.
- NAKANO, S. "Psychological Studies on Learning of School Subjects: XI—The Causes of Difficulty in Learning Gymnastic Exercises." *Japanese Journal of Educational Psychology*, Vol. 7, No. 4, 1960.
- NATIONAL LANGUAGE RESEARCH INSTITUTE. "Study of Language Development of School Children." *Annual Report of National Language Research Institute*, No. 8-10, 1957-59.
- THE NEW EDUCATION STUDY GROUP ORGANIZED BY THE ATTACHED JUNIOR AND SENIOR HIGH SCHOOLS. "A Note on the Method of the Entrance Examination in the Attached School." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957.
- NHK RADIO AND TV CULTURE RESEARCH INSTITUTE. "Reports of the Second Survey in Shizuoka Prefecture." *Bunken-Geppo*, Vol. 10, No. 7-11, 1960.
- NISHIBORI, M., and SHIBUYA, K. "A Study on the Validity of the Scholastic Aptitude Test." *Bulletin of the National Institute for Educational Research*, No. 20, 1960.
- NISHIBORI, M.; MATSUSHITA, Y.; and SHIBUYA, K. "A Study on the Selection of College and University Students—An Analysis of the Records of Applicants Who Applied for Admission to the Same Colleges and Universities Two or More Times." *Bulletin of the National Institute for Educational Research*, No. 25, 1961.
- NISHIBORI, M., and OTHERS. "A Study on Validity of the Scholastic Aptitude Test." *Bulletin of the National Institute for Educational Research*, No. 7 (1), 1955.
- NISHIBORI, M., and OTHERS. "A Study on the Validity of the Scholastic Aptitude Test." *Bulletin of the National Institute for Educational Research*, No. 7 (2), 1958.
- NISHIYAMA, S. "An Experimental Study of Group Discussion." *Educational Studies, Faculty of Education, Hiroshima University*, Part I, Vol. 7, 1959. (a)
- NISHIYAMA, S. "A Study on the Effect of Discussion on Group Decision." *Japanese Journal of Psychology*, Vol. 30, No. 2, 1959. (b)
- OBONAI, T., and NAGASAWA, K. "Psychological Study of Learning English (2)." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 3, 1957.
- OBONAI, T., and NAGASAWA, K. "Psychological Study of Learning English (5)." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 6, 1960.
- OGATA, R. "Relationship Between Achievement and Intelligence Measured by Intelligence Tests." *Bulletin of the Faculty of Liberal Arts and Education, Nagasaki University*, Vol. 4, 1958.
- OGAWA, K. "A Study of Teachers' Attitudes Toward the Behavior Problems of Pupils (No. IV)." *Japanese Journal of Educational Psychology*, Vol. 5, No. 2, 1958.
- OGAWA, T. "An Analysis of a Teaching Process (First Report)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 5, 1959.
- OGAWA, T.; KIHARA, K.; and FUKAYA, S. "Human Relations in the Instructional Procedure—A Study from the Point of View of the Sociology of Education." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 5, 1959.
- OGAWA, T.; KIHARA, K.; and YAMADA, M. "Human Relations in the Teaching Process." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 6, 1960.
- OCURA, M., and OTHERS. "Studies on the Development of Knowledge About Health." *Bulletin of the Faculty of Education, University of Tokyo*, Vol. 5, 1960.
- OHNISHI, S. "Factorial Studies on Educational Objectives: III—An Analysis of Objectives in the Course in Japanese." *Japanese Journal of Psychology*, Vol. 30, No. 6, 1960.
- ONISHI, S. "Problems in Research on Family Relations." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 4, 1958.

- ONISHI, S., and OTHERS. "Family Relations and Personality Formation." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957.
- SAEKI, S., editor, *Improvement of Teaching by Analysis of the Learning Process*. Tokyo: Meiji-Tosho, 1961.
- SAITO, K. "The Developmental Changes in the Differences Between Reality and Expectation Levels—An Approach to the Quantitative Expression of Some Aspects of the Adolescent Mind." *Philosophy—Keio University Centennial Issue*, No. 35, 1958.
- SAKAKIBARA, K. "A Study of the Mental Test for the Blind." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 1, 1955.
- SATO, T. "Examiner's Influence on Subjects in a Test Situation—On Influence Observed Through the Change Resulting from Repeated Testing." *Japanese Journal of Educational Psychology*, Vol. 7, No. 3, 1959.
- SATO, Y. "Development of Sociality of the Blind and Slightly Sighted Children." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 5, 1959.
- SAWA, H. "An Approach to the Development of Intelligence in the Use of WISC." *Bulletin of the Faculty of Liberal Arts and Education, Nagasaki University*, Vol. 3, 1957.
- SAWA, H. "An Analysis of Identical Twins' Intelligence." *Japanese Journal of Educational Psychology*, Vol. 6, No. 1, 1958.
- SAWADA, K. "A Study Concerning the Relation Between Intelligence and the Formation of the Head and Face (2)." *Japanese Journal of Psychology*, Vol. 30, No. 2, 1959.
- SAWADA, K. "A Study Concerning the Relation Between Intelligence and the Formation of the Head and Face (3)." *Japanese Journal of Psychology*, Vol. 30, No. 6, 1960.
- SAWADA, K., and OTHERS. "Psychological Studies on Learning of School Subjects: VIII—Children of Inferior Ability in Learning the English Language." *Japanese Journal of Educational Psychology*, Vol. 7, No. 2, 1959.
- SAWADA, K., and OTHERS. "A Study of Understanding of English Words from the Viewpoint of Educational Psychology." *Japanese Journal of Educational Psychology*, Vol. 8, No. 2, 1960.
- SAWADA, K., and OTHERS. "A Study of Aptitude for Learning English." *Japanese Journal of Educational Psychology*, Vol. 9, No. 1, 1961.
- SEKI, S. "Development of Children's Understanding of Causal Relations: II—Development in Early Childhood." *Japanese Journal of Educational Psychology*, Vol. 6, No. 3, 1959.
- SHIGEMATSU, T., and OTHERS. "Research of Thinking Through R. R. Method—Children's Understanding of Labour (First-Seventh Report)." *Bulletin of the Faculty of Education, University of Nagoya*, Vols. 1-7, 1955-61.
- SHIGEMATSU, T., and OTHERS. "Research in Children's Thinking (First Report)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957.
- SHIODA, Y., and OHASHI, M. "A Psychological Study on Sibling Relations (1, 2)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 4, 1958. Vol. 5, 1959.
- SHIODA, Y., and OTHERS. "An Investigation of Pupils' Achievement Damaged by Isewan Typhoon." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 7, 1961.
- SHIODA, Y., and OTHERS. "Parents' Expectancies—Children's Desires and Children's Personalities." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957.
- SHIRAI, I.; SASAYAMA, M.; and KAWANISHI, Y. "Logic and Psychology of Reading —A Study of Reading Ability in Japanese (3)." *Bulletin of Osaka City Institute for Educational Research*, No. 32, 1958.
- SUHARA, K., and HOSHI, T. "On the Pure Tone Audiometry of Deaf Children." *Bulletin of the Faculty of Education, Tokyo University of Education*, Vol. 3, 1957.
- SUMIDA, K. "An Analytic Study of Intelligence Test Performance for a High-Intelligence Group." *Kyoto University Research Studies in Education*, Vol. 7, 1961.
- SUNAZAWA, K., editor, *Studies on the Learning Process*. Tokyo: Meiji-Tosho, 1959.
- SUNAZAWA, K., and SUZUKI, S. "Surveys of Teaching." *Bulletin of the Faculty of Education, Hokkaido University*, Vol. 7, 1960.
- TAKAHASHI, S. "An Investigation into Aggressive Behavior of Children as Seen Through Projective Tests." *Japanese Journal of Educational Psychology*, Vol. 8, No. 2, 1960.

- TAKANO, T. "An Experimental Study on the Function of Observation in Learning Science (Fifth-Ninth Report)." *Bulletin of Educational Faculty of Ibaraki University*, No. 5-10, 1957-59.
- TOGAWA, Y.; MISHIMA, J.; and ASAI, K. "A Fundamental Study on the Intelligence Test for Deaf Children." *Philosophia, Waseda University Philosophical Society*, No. 34, 1958.
- TOYAMA-CITY HORIKAWA ELEMENTARY SCHOOL. *A Study of the Teaching-Learning Process*. Tokyo: Meiji-Tosho, 1959.
- TSUDZUKI, A. "Prediction of the Adjustment of Middle School Pupils to School Life." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957. (a)
- TSUDZUKI, A. "Prediction of the Scholastic Adjustment in Middle School Pupils." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957. (b)
- TSUDZUKI, A. "Studies on Egoism of Family (1-4)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3-5, 1957-59.
- TSUDZUKI, A., and MASUDA, S. "Follow-Up Studies on the Predictability of Diagnostic Instruments in Educational Psychology." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 4, 1958.
- TSUDZUKI, A., and MASUDA, S. "Social Stratum, Parent-Child Relations, and Friendship in a Rural Community (1, 2)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 5, 1959, Vol. 6, 1960.
- TSUDZUKI, A., and OTHERS. "Psychological Studies on Learning of School Subjects: VI—A Psychological Study on the Methods of Science Teaching in Secondary School." *Japanese Journal of Educational Psychology*, Vol. 7, No. 1, 1959.
- TSUMORI, M., and INAGE, N. "Maternal Attitude and Its Relationship to Infant Development." *Japanese Journal of Educational Psychology*, Vol. 5, No. 4, 1958.
- TSUMORI, M., and INAGE, N. "A Study on Dependency of Children—Relationship of Dependency Compliance to Parents' Attitude." *Japanese Journal of Educational Psychology*, Vol. 7, No. 4, 1960.
- USHIJIMA, Y., and NAGATSUKA, S. "Nursing in Kindergartens of Our Country." *Research Bulletin*, No. 7, 1958. Research Institute of Comparative Education and Culture, Kyushu University.
- USHIJIMA, Y., and YAMAKAWA, T. "Diagnosis of Children's Personalities by Their Drawings." *Research Bulletin*, No. 7, 1958. Research Institute of Comparative Education and Culture, Kyushu University.
- YAMAGUCHI UNIVERSITY HIKARI ELEMENTARY SCHOOL. *Learning Activity and the Teaching-Learning Process*. Tokyo: Seishin Shobo, 1959.
- YODA, A., and KUZE, T. "Psychological Study of Parent-Adolescent Relationships—On Psychological Weaning (1, 2)." *Bulletin of the Faculty of Education, University of Nagoya*, Vol. 3, 1957. Vol. 4, 1958.
- YODA, A., and KUZE, T. "Parent-Adolescent Relationships and Social Attitudes." *Japanese Journal of Educational Psychology*, Vol. 6, No. 4, 1959.
- YODA, A., and OTHERS. "A Study on Dependency of Young Children." *Japanese Journal of Educational Psychology*, Vol. 9, No. 1, 1961.
- YONEYAMA, H. "On the Aggressive Behavior of Children." *Japanese Journal of Educational Psychology*, Vol. 5, No. 4, 1958.
- YOSHIDA, N. "Development of Concepts of Relation in Usage of Terms in Social Studies." *Japanese Journal of Educational Psychology*, Vol. 6, No. 4, 1959.
- YOSHIKAWA, F. "Development of Self-Consciousness in Adolescence." *Japanese Journal of Educational Psychology*, Vol. 8, No. 1, 1960.

CHAPTER V

Israel

MOSHE SMILANSKY *

IF THE WORK of school inspectors, school principals, and teachers in their day-to-day endeavor to find new approaches and to improve educational methods is excluded from this chapter, and if only scientifically organized research and experimentation are considered, it appears that (a) educational research in Israel is almost as young as the State of Israel itself and (b) until about two years ago, educational research was carried on almost exclusively by the Szold Institute. Recently, however, interest in educational research has grown. Hebrew University's School of Education has opened a Department for Educational Research, and other academic institutions have begun to exhibit an interest in research in this field.

To understand the development of educational research in Israel, one must have some knowledge of the Henrietta Szold Institute, which has played such an important part in the research that has been completed to date. The Szold Institute is a public agency, which was founded in 1942. Its aim is to promote the welfare of the child by means of research, publication, and advisory work connected with the planning of services. The Institute works in cooperation with the Ministry of Education and other agencies. In the Institute's beginnings, the budget was very limited, but the small staff that was employed did its best to contribute to the clarification of the problems that seemed crucial during that period. Gradually the Institute's studies began to arouse interest in various quarters. When it was shown that research could be successfully combined with administrative action on the part of the Ministry of Education, with educational experiments, and with the evaluation of services, the Institute's budget was enlarged, and its sphere of activities became more comprehensive.

The success of educational research in contributing to the understanding of various problems and to the improvement in child-care services has enhanced its prestige. In consequence, research workers are now being invited to take part in the deliberations and planning conducted by those responsible for the educational system. Increasing budgets are available for additional research and experimentation. In fact, it would seem that the present enthusiasm for educational research has created its own problems. First, the ability of research to provide solutions for all kinds of educational problems is being overestimated. Second, the demand of the child and welfare-service agencies for work based on a sound theoretical basis and yet capable of practical application outstrips the

* * The author is greatly indebted to Mrs. S. Weintraub of the Henrietta Szold Institute for her assistance in translation and in preparation of the bibliography.

supply of qualified workers to satisfy the demand. These problems, however, which reflect a renaissance of research activity in the country, hold interesting promise for the future. The research reports which follow do not cover all aspects of the educational research going on in the country. However, they have been selected as (a) the most significant efforts and (b) representative of the research interests in education in Israel.

Test Development

Interest in research on test construction and evaluation has developed on a large scale only within the past year. The Ministry of Education has recently recognized the need for a battery of diagnostic achievement tests for all the grades of the elementary school. Priority has been given to the development of tests in such subjects as language, reading, and arithmetic, and to the preparation of a graduated group test of ability. The Szold Institute is preparing these tests in three parallel batteries, graduated according to the official curriculum for the elementary school. At the end of the 1961-62 school year, a countrywide survey will be carried out on a national sample including about 10,000 pupils in each of the grades 2, 4, 6, and 8. The same sample will be retested within a few years' time.

Hebrew University's School of Education is also active in this field. The projects now under way at the University include an adaptation of the *Lorge-Thorndike Intelligence Tests*, the preparation of a graduated achievement test in reading, and the construction of a test for young children. Some vocational-guidance bureaus and the Army Education Branch are also active in test development. A fresh impetus in this direction will be given by the National Guidance Institute, which was opened this year by the Ministry of Education jointly with the Ministry of Labor. One important function of the Institute is the preparation of tests and other tools of evaluation.

Child-Care Services

Evaluation of Child Needs and the Extent to Which They Are Being Met

The Szold Institute has carried out, during the past two years, a survey of all severely retarded children (IQ's up to 50) in the country, both those in institutions and those living at home. The study design included medical and psychological examinations of the children and interviews with parents. The statistical data were summarized in an operational report which is to serve as the basis for planning and reorganizing care and treatment facilities.

Langerman, Hirshenberg, and Hen (1958) and Langerman (1959) studied the reading habits of school children to discover how much chil-

dren read and what types of books or papers they read. The sample included elementary-school pupils aged 13-14 years and secondary-school pupils aged 17 years.

Other projects now under way include a survey of the socioeconomic conditions of youth in new immigrant settlements, being carried out by sociologists in the Settlement Department, and a large-scale survey of social education and leisure-time activities of school youth, being conducted by the Szold Institute.

Evaluation of Child-Care Institutions and Auxiliary Services

Epstein (1950) evaluated the services of institutional homes for babies. The effort was characteristic of a group of institutional-research studies designed to assess the extent to which the institutions are meeting the needs of those in their care.

The Szold Institute and the Pedagogical Secretariat for Secondary Education in the Ministry of Education are engaged in a current investigation of testing. The study branches out in three directions: (a) Examination of the reliability of marks given in external examinations. The marks given by different examiners for the same papers are compared, and the scatter and deviations are evaluated. (b) Examination of the differences in marking the achievement of pupils in grade 8 in various schools. This is done by means of scaling these internal marks on the basis of marks given in external examinations. (c) A follow-up investigation of two graduating classes, which include about 5000 secondary-school graduates and external students, in order to determine the degree of correlation between results in matriculation examinations and success in higher studies.

Evaluation of School Subjects

In the evaluation of school subjects, mention should be made of the study on the teaching of English in secondary schools being carried out by the Hebrew University's School of Education and of the international comparative study on the teaching of mathematics which is being conducted in 12 countries on the initiative of the Institute for Education of the United Nations Educational, Scientific, and Cultural Organization. The Szold Institute is also participating.

Follow-Up of Graduates

The main purpose of follow-up investigations of graduates has been to find out what percentage of them chose the vocation for which they were trained, how they adjusted to their job, and how they evaluated

the training and guidance that they had received. In Israel, a special difficulty exists in conducting research of this kind. At the age of 18, that is, after graduation from secondary school (or completion of apprenticeship), each young man or woman is required to serve in the army for two and a half years. Only after his period of service can he resume higher studies or start working. Thus, at least four to five years have to be allowed before a follow-up investigation can be undertaken. An additional problem is that the changes in the pupil population, associated with successive waves of immigration from countries differing widely in sociocultural background, as well as with the rapid social and economic development of Israeli society, limit the predictive value of information collected from one group of graduates for the understanding of career requirements for subsequent groups.

The following national follow-up studies have been conducted by the Szold Institute in recent years: (a) Ortar's (1960) follow-up study of elementary-school graduates three years after graduation; (b) Smilansky and Parnes' (1960) follow-up investigation of elementary-school graduates who received guidance in the vocational guidance bureaus; (c) Parnas-Honig's (1958) follow-up survey of Youth Aliyah wards who attended agricultural boarding schools; (d) Naddad's (1958) follow-up evaluation of Youth Aliyah graduates; (e) Mizrahi's (1958) follow-up study of agricultural-school graduates; and (f) Szold Institute studies of vocational-school graduates and participants in apprentice courses (Smilansky and Adar, 1961), of elementary-school graduates in a city populated by immigrants (Enoch, 1952), and of Teachers' Training College graduates (Adar, 1957).

It is clear from the description of these follow-up studies that a certain tradition has already been formed and that a considerable body of work has been completed. However, for follow-up studies of another type, i.e., those longitudinal studies that are designed to *accompany* the educative process from its beginnings, only a start can be noted as yet. The Szold Institute has started a longitudinal study in cooperation with the Youth Aliyah and the Child Department of UNESCO. Here the development of a group of 12-year-olds, placed by Youth Aliyah in a kibbutz for a period of four years, is being followed.

This investigation started with interviews with parents who had applied for placement for their children. In the next stage, tests of ability, achievement, and attitudes were administered, and observation of the group at work and during social activities was conducted. The group's instructors and teachers and the children themselves were interviewed. Sociometric tests were given from time to time in order to measure the group's cohesiveness and social development. The final stage will be a follow-up investigation of the youngsters after they leave the kibbutz.

While the longitudinal study is designed to evaluate a well-established educational framework, the Szold Institute is also embarking on a project designed to evaluate a newly created framework. Last year the Ministry

of Education opened special boarding houses for gifted children from socioculturally underdeveloped strata who, for various reasons, cannot benefit from secondary education in their home localities. The pupils are enrolled in regular day-secondary schools. In the afternoon they take part in specially designed educational activities in the boarding houses. The Szold Institute accepted the responsibility for evolving adequate tools for the identification of the gifted and for a continuous follow-up analysis of their development. The data will be based upon information furnished by intelligence and achievement tests, school teachers' evaluations, testimonies of boarding-home instructors, and pupils' opinions of the program.

Improvement of Teaching Methods

Three studies are currently being conducted concerning the kindergarten as a place for developing intellectual ability in children from socioculturally underdeveloped strata and for preparing them for school entrance. The Kindergarten Inspectorate is engaged in implementing a planned daily program of activities, in adapting the equipment, and in intensifying guidance for kindergarten children. The Inspectorate is also experimenting with a kindergarten-type first grade, i.e., a framework in which the basic skills of reading, writing, and reasoning are taught in a kindergarten atmosphere. The Szold Institute, in cooperation with the Inspectorate, has started an intensive study and experiment that is designed to examine the patterns of development in children aged four to six and to try out new methods of promoting intellectual development.

The first stage is a study of child-rearing patterns in families differing in sociocultural background. The children's abilities will be examined at age four, and a deliberate effort will be made at developing various skills and abilities. Achievement will be tested at the end of the year. The children's progress will be followed, and at the end of the first and second grades their achievement in reading and other skills will be examined and compared with those of a control group that has not received such special care. The aim is to find out to what extent the planned development of intellectual abilities in preschoolers can help them in their school careers.

One of the more interesting methods studies conducted over the past three years by the Ministry of Education's Pedagogical Secretariat and the Szold Institute was designed to improve the teaching of reading to first-graders from underdeveloped strata in society. At first, six instructors were chosen, each of whom had evolved a particular method of teaching reading, beginning with a purely phonetic method through several composite ones and ending with a word-sight method. Each instructor was given the necessary funds to prepare the teaching materials and allocated several classes whose teachers were under constant

intensive supervision and guidance. A staff of examiners constructed a battery of tests to examine abilities and achievements at the beginning of the school year in the experimental and control classes. The examiners were not informed of the differences in the six methods, while the instructors did not know the contents of the tests. Both the examiners and the instructors were supervised by a committee composed of elementary-school inspectors and experts in educational, sociological, and psychological research.

In the following school year three out of the six instructors had evolved a coherent method which seemed worthy of further experiment. Each of them was allocated a larger number of classes, but guidance of teachers became less extensive and was limited to one conference per month in which methods were demonstrated and guidance was given. At the end of the year, the results gained in the experimental classes were distinctly better than those in the control classes. In fact, two of the three instructors achieved results almost equal to those recorded in "normal" (i.e., attended by children from advanced homes) classes. In consequence, the Ministry decided to enlarge the scope of the experiment to all classes attended mainly by children from the underprivileged strata, and in the third year about 500 classes were included. This time, evaluation of the results was done by means of questionnaires sent out to teachers, principals, and inspectors. Since more than 90 percent of them reported good results and expressed their wish to continue with the method, the experimental framework was deemed no longer necessary; the material is now supplied to any teacher wishing to use the method. This year the testing of results will be carried out at the end of the first and second grades in classes studying under the new methods but without the teachers' receiving special guidance and having the special incentive characteristic of participation in experiments.

Currently, experiments employing the same methodology as just described are being conducted by the Szold Institute and the Ministry of Education on methods of teaching language in the second grade, geography in the fourth grade, and arithmetic in the fourth and fifth grades. The results will be evaluated by means of achievement tests and teachers' and inspectors' opinions.

A final experiment in this area has been directed toward major work in grades 7 and 8. The aim of this experiment, which has been carried out during the past two years at the initiative and as the responsibility of the Pedagogical Board, is to test the possibility of special settings in the last two grades of the elementary school for major work in certain school subjects, such as algebra and English or language and general science. The experiment applies to the abler pupils, who are expected to go on to an academic secondary school. The selection is done on the basis of class teachers' recommendations. An extension of this program to the other school subjects and to additional schools is now being considered.

Children from Underdeveloped Strata in the School System

Much of the educational research in Israel revolves around the problems created by mass immigration and by underdeveloped sociocultural areas.

Historical and Cultural Perspective

The problem of children from underdeveloped strata arose and developed in the Jewish community in Palestine in the period between the World Wars I and II, when groups of immigrants from Arabic-speaking countries, who had lived in an agrarian, preindustrial society, came to the country. They were faced with the difficulties of adjusting to a more complex social and economic structure. It ought also to be mentioned that, from those Islamic countries in which a Jewish society had been stratified during the period before the establishment of the State of Israel in 1948—and to some extent also afterwards—mainly members of the underdeveloped strata immigrated to Israel. Many of the economically and socially advanced elements remained in their countries of origin or emigrated to countries which seemed to promise a better economic future than Palestine.

Thus it was that a very close connection developed between socioeconomic status and ethnic origin, with Oriental immigrants settling closely together in certain urban neighborhoods which soon developed into slum areas. The operation of the vicious circle can easily be traced. Because of the parents' cultural background, low level of education, and lack of vocational training suited to the social and economic structure of a developing technological society, members of these underprivileged strata were forced into low-paid, dead-end occupations. At the same time, families became large because of a high birthrate (almost twice that of the European Jews) on one hand and the high standard of health services developed by the Jewish community on the other. Inevitably, the existence of a low income and of a large number of dependents led to overcrowding, malnutrition, early school leaving, and child labor.

The children who grew up in these families very often found themselves in a marginal position. They had dissociated themselves from their parents' values and cultural patterns and had struggled to take part in the new culture. However, they could not receive educational, cultural, or emotional support from their parents or from their community. In short, they failed to integrate within the dominant social and economic structure. The failure of the children and adolescents in this state of transition was expressed in scholastic failure, evident from the first elementary grade and reaching an extremely high percentage of grade-repetition. This continuing failure increased the discrepancy between the child's ego and grade

level and led the child and his parents to believe that he was incapable of meeting school requirements. This circumstance, combined with economic pressure, led to early school leaving and to the youngster's entrance into the labor market—again, into unskilled occupations with little chance for social or vocational mobility. In extreme cases this failure led to social deviation, which started with truancy and waywardness and sometimes degenerated into delinquency.

The establishment of the State in 1948 and the occurrence of mass immigration from Arabic-speaking countries brought about two main changes in the picture. *First*, governmental agencies were created which could deal with social problems. The Compulsory Education Law was passed. Social, educational, and health services were enlarged. *Second*, mass immigration from countries of the Middle East soon changed the numerical proportion of the various ethnic groups. Thus, people of Oriental origin in the total population currently number about 50 percent; whereas, in the youngest age groups, they number about 60 percent.

Neither the society in general nor the educational network in particular was ready for this development. The first years after the establishment of the State were devoted to coping with the tremendous technical problems created by mass immigration. Within one decade the number of pupils increased fivefold, from 100,000 to 500,000; while the number of teachers rose fourfold, from 5000 to 20,000. Obviously, all these new teachers had to be trained; schoolhouses had to be built; and equipment had to be provided.

The educational system was shackled by an ideology of formal equality. Its leaders were not willing to hear testimonies or opinions concerning the question of whether the same methods of teaching and the same curriculum should be applied to children from widely differing backgrounds and in unequal stages of development. The sources and motives of this egalitarian ideology are understandable and, in the initial period of the State's existence, largely justifiable. The most important aim was to create in every inhabitant of the country—whether old-timer or new immigrant—a belief in the basic equality of all citizens and in the unity of the nation as the foundation for a just and progressive social life. This principle was especially valuable in facilitating the initial adjustment of immigrants from dozens of different cultures and social systems. It undoubtedly contributed decisively to the initial successes of the State in creating a social equilibrium and in consolidating a very heterogeneous society which rose by leaps and bounds, tripling within the short period of 10 years.

However, the problem could not be relegated to the background forever, and the demand for educational experimentation designed to solve the problem was more and more insistently voiced. Some of the research directed toward this problem area has already been mentioned, i.e., the reading experiment; but the full spectrum of efforts will now be discussed within the framework of the following five categories: (a) practices of child-rearing in backward groups; (b) socioeducational studies in

slum areas; (c) school-adjustment problems of immigrant children and children from underdeveloped strata; (d) intellectual development at higher levels in the educational system of children with disadvantageous backgrounds; and (e) gifted children from underdeveloped strata.

Child-Rearing Practices

Feitelson (1955) investigated child-rearing patterns among immigrants from Kurdistan. This study was based on observation and interviews with a sample of Kurdish families. The study provided the first picture of child-rearing patterns typical of an agrarian society, traced some factors in patterns of living and family values that influence the methods of child-rearing, and pointed up some of the problems with which these families have to cope in trying to adjust to Israeli society and its values.

Kohls (1956) focused on a new agricultural settlement composed of North African immigrants from the Atlas Mountains. The researcher became a participant-observer in the life of this community from the moment of arrival in the settlement, lived among them for months, and collected information and reactions from the immigrants and from the team of workers sent by the absorbing agencies to help the settlers in the initial period of adjustment. An attempt was made both to reconstruct the patterns of living in the country of origin and to follow up the processes of adjustment.

Additional studies of this type have been conducted in a number of settlements, including Arab villages, by the Ministry of Welfare's Department of Community Organization and by the Ministry of Health. In the current year, the Szold Institute and the Housing Department of the Labor Ministry are studying child-rearing patterns in four ethnic groups and in various ecological settings, with a view to discovering their influence on the development of the child's intellectual abilities. The study design includes interviews with some 400 mothers from Persia, Yemen, Iraq, and Poland. The families come from different socioeconomic groups and from different types of localities—cities, agricultural villages, and kibbutzim.

Socioeducational Studies

The first comprehensive study of this type by Naddad (1956) was a census survey of all inhabitants in a Tel Aviv suburb. This work was the first to portray life in an urban slum—bad housing conditions, inadequate sanitary facilities, low income level, and low educational level. By means of a closed questionnaire and interviews, data were gathered on the demographic, social, and educational situation of the whole neighborhood. The survey contributed to an awakening of interest in the socioeducational problems in this sphere.

A second study, by Katz and Zloczower (1958), was carried out in a suburb with many well-established, older settlers. In this suburb, in which one ethnic group was concentrated, social problems were created because of a background of feelings of discrimination, especially by the younger generation, toward the rest of the town, inhabited by immigrants from Europe. In this study, interviews were held with a sample of families, and background data were collected from service workers in the municipality and from the leaders of the community. The main point uncovered by the study was the great difficulty experienced by the second-generation inhabitants of slum areas in improving their socioeconomic status, handicapped as they were by low level of education and lack of vocational training. Because of this situation, feelings of envy and frustration—sharpened by the inevitable comparison with the more fortunate youth dwelling in the other sections of the same town—were almost certain to develop.

School-Adjustment Problems

The first study in the area of school-adjustment problems was that of Feitelson-Shur (1953), who investigated the failure of first-graders. The procedure included administration of intelligence and achievement tests, observation in class, and interviews with children. The study showed a high percentage of failure among the children and pointed up the inadequacy of the prevalent teaching methods, which had been developed for children from advanced European sociocultural backgrounds.

A second study, by Adar (1956), examined fourth-grade scholastic difficulties of immigrant children and children from backward strata. The project attempted to analyze the extent to which these children succeeded in acquiring the basic skills of reading and writing and how well the subject matter, textbooks, and methods of teaching were adapted to their needs.

Studies by Simon (1957) at the second-grade and third-grade levels and by Smilansky (1957) at the postelementary level reemphasized the picture of low achievement and the unsuitability of the curriculum, the teaching methods, and the textbooks to the needs and capacities of these children. Simon discovered an average percentage of failure of 55 percent as against 11 percent in the control groups of normal children in language, 54 percent against 13 percent in Bible study, and 44 percent against 13 percent in arithmetic. About one-half of the pupils in grade 3 and about one-third of those in grade 4 were unable to read, compared with 9 percent in grade 3 and none in grade 4 in the control classes.

Intellectual Development

Two significant studies have been conducted of the intellectual development of pupils with disadvantageous backgrounds in the higher levels of

the educational network. In the first of these, Ortar (1959) examined differences in intelligence of immigrant children from Islamic countries and of native-born children whose parents came from Islamic countries.

The major instrument in the study was the *Wechsler Intelligence Scale for Children*, which was administered to more than 1000 children. The groups investigated included children of Moroccan, Yemenite, Persian, and Kurdish origin in various Jerusalem schools and all the pupils of a sixth-grade school in a neighborhood populated mainly by immigrants from Kurdistan. As control groups, backward children tested by the municipal guidance bureau and pupils of a selective school attached to Hebrew University—mostly from well-to-do social strata—were chosen.

In contrast to a belief prevalent especially among American psychologists, the study showed, first of all, that performance tests were not a reliable tool for measuring the intelligence of members of cultures other than the one in which the test was initially constructed. The verbal tests, on the other hand, proved to be much better predictors of future school success, and the results gave a better scatter around the mean. Apparently, these tests are valid for various cultures. Secondly, the study results showed a steady deterioration in both verbal and performance IQ among the children under consideration. This decline started around age 10, when the average of the Israeli-born children from the underdeveloped strata fell from 98 to 94, falling steadily further with age, until an average of 87 was recorded at age 14. In the performance battery the decline was from 90 to 76; among members of the same ethnic groups who immigrated recently the decline in verbal IQ was from 87 at age 9 to 80 at age 14, while in the performance IQ it fell from 86 to 74 in the above-mentioned ages. As opposed to this, the children in the selective school showed a rise in IQ from an average of 112 to 113 in the verbal part and of 110 to 113 in the performance part.

In the second study, the Ministry of Education's National Survey, a yearly achievement examination for all pupils in grade 8 of the elementary school, has shown consistently over several years that only 12 percent of the children whose parents immigrated from Islamic countries obtained an average mark of 8 or more (out of a maximum of 10), as against 40 percent of the children of European origin. A nationwide census of all postelementary schools showed for the first time how low was the percentage of Oriental immigrant children in postelementary schools, in general, and in secondary schools—academic ones in particular. Moreover, the census figures showed that this percentage declined in the senior grades and became minimal among secondary-school graduates and students in higher education.

Gifted Children from Underdeveloped Strata

Two experiments now being conducted concern gifted children from underdeveloped strata. The first began last year when, near the end of the

school year, 80 boys and girls from all over the country were chosen and placed in a boarding home maintained by the government. The youngsters were enrolled in the regular four-year secondary schools, which they attend in the mornings. Various extracurricular activities are conducted in the afternoons in the boarding homes.

The students attend the regular secondary school in the mornings, and in the afternoons and evenings they are offered various activities. They are tutored in preparing homework; they receive coaching in the subjects in which they are weak; they participate in special-interest groups by free choice. Social and recreational activities are guided by social instructors. In order to follow up and evaluate the process, various tools are used, including teachers' and instructors' marks and opinions; pupils' opinions of their teachers and instructors; pupils' evaluations of their own adjustment and that of their fellows; and essays. When the four-year period is over, the development of these pupils will be compared to that of other children of a similar intellectual level and socioeconomic background who were not accepted into the boarding home. This year a new group of 80 students was accepted into the boarding home and into the first grade of the secondary school, so that there are 160 in all. Each year a similar-sized group will be added.

The second project, which will take three years, is an attempt to identify gifted children from underdeveloped strata at an earlier stage of their school career and to give them special preparation for secondary studies. The basic assumptions of this project are the following: (a) Children from underprivileged strata do not develop their full intellectual potential in the regular elementary school, and the existing intelligence tests are unfair to them because they assume the presence of previously acquired intellectual equipment which, in reality, is found only in children from an enriching home background. (b) A formal equality in curriculum and methods leads, in reality, to discrimination, because the children are incapable either of performing in the required way or of benefiting from the methods. (c) A deliberate attempt to foster the development of children from underprivileged strata ought to start at an early age; but, in any case, a differentiation in abilities becomes marked with the onset of adolescence, and special care should begin at least two years before the end of elementary school.

For the purposes of this project, about 40 grade 6 classes in three urban areas were selected from a list of schools attended mainly by children from underprivileged strata. The survey results over a period of several consecutive years showed that only very few pupils in those schools obtained average marks entitling them to enter secondary schools. The schools selected will introduce settings for the study of language, arithmetic, and English. By means of achievement tests, the homeroom teacher will select those scoring in the upper quarter in each class. Those pupils will take part in the special activities conducted in a center set up for the purpose. Some of the groups in this center will be prepared for entrance into secondary

school in subjects such as language and science. Other groups will engage in various activities designed to foster general development, e.g., literature, dramatics, and music. The children will be accepted into the groups on the basis of an entrance examination. The method of evaluation in this project will be similar to that previously described in connection with the boarding home.

Summary

It may perhaps be said that, in Israel, some success has been achieved in combining research and experimentation with practical measures designed to improve the education of children. The work is not free from handicaps. Adequately qualified workers are hard to find; new tools of evaluation have to be evolved; funds are never adequate for the magnitude of the task. However, all these handicaps are natural and inevitable in a young country with limited resources. It is still too early to evaluate the work because it is still in its beginnings. However, one achievement is already evident: a growing appreciation—on the part of those responsible for the educational network—for the contribution that educational research and experimentation can make toward an improvement in methods of child care and education.

Bibliography

- ADAR, L. "A Study on the Scholastic Difficulties of Immigrant Children in the Fourth Grade of the Elementary School." *Megamoth* 7: 139-80; April 1956.
- ADAR, L. "Leaving the Teaching Profession: Extent and Causes of the Problem." *Megamoth* 8: 184-200; April 1957.
- ENOCH, C. "Elementary School Graduates in Tel-Aviv [1949-50; 1950-51]." *Megamoth* 4: 3-26; October 1952.
- EPSTEIN, S. Y. "Institutional Care of Infants and Young Children in Israel." *Megamoth* 1: 347-64; July 1950.
- FEITELSON, D. "Some Changes in the Educational Patterns of the Kurdish Community in Israel." *Megamoth* 6: 275-97; October 1955.
- FEITELSON-SHUR, D. "Causes of Scholastic Failure in First Graders." *Megamoth* 4: 37-63; October 1952. 5: 123-81; January 1953.
- KATZ, E., and ZLOCZOWER, A. "Ethnic Continuity in the Second Generation: A Report on Yemenites and Ashkenazim [European Jews] in a Small Israeli Town." *Megamoth* 9: 187-200; July 1958.
- KOHL, M. "Culture Patterns and Adjustment Processes of Moroccan Immigrants from Rural Areas." *Megamoth* 7: 345-76; October 1956.
- LANGERMAN, S. "Reading Patterns of Eighth Grade Pupils." *Megamoth* 10: 3-14; July 1959.
- LANGERMAN, S.; HIRSHENBERG, O.; and HEN, M. "Reading Patterns of High School Youth." *Megamoth* 9: 286-300; October 1958.
- MIZRAHI, Y. "A Follow-Up Study of Secondary Agricultural School Graduates." *Megamoth* 9: 150-55; April 1958.
- NADDAD, A. "Kfar Shalem—A Study of a Slum Area." *Megamoth* 7: 5-39; January 1956.
- NADDAD, A. "A Follow-Up Study of Youth Aliyah Graduates." *Megamoth* 9: 133-49; April 1958.
- ORTAR, G. "Verbal and Performance Tests: Their Relative Value as Tools for Inter-cultural Comparison." *Megamoth* 9: 207-27; July 1959.

- ORTAR, G. "The Predictive Value of the Eighth Grade Survey Tests: A Follow-Up Study." *Megamoth* 10: 207-21; January 1960.
- PARNAS-HONIG, T. "The Significance of Youth Aliyah Education for the Social Integration of Immigrant Youth from Rural Settlements." *Megamoth* 9: 124-32; April 1958.
- SIMON, A. "On the Scholastic Achievements of Immigrant Children in the Lower Elementary Grades." *Megamoth* 8: 343-68; October 1957.
- SMILANSKY, M. "The Social Implications of the Educational Structure in Israel." *Megamoth* 8: 230-99; July 1957.
- SMILANSKY, M., and ADAR, L., editors. *Evaluating Educational Achievements*. UNESCO Educational Studies and Documents, No. 42, Paris: UNESCO, 1961.
- SMILANSKY, M., and PARNES, T. "Educational and Vocational Guidance in Israel: A Follow-Up Study." *Megamoth* 10: 242-70; January 1960.

CHAPTER VI

East Africa

P. G. WINGARD

EDUCATION in the East African nations—Kenya, Tanganyika, Uganda, and Zanzibar—has naturally been greatly influenced by British practices and thinking in education. Considerable efforts have been made to adapt the system and the instruction to local needs, but such efforts cannot as yet be based on the findings of fundamental research. Most of the basic information that is available in Europe and America is lacking in East Africa.

Child Development

Child-development studies have hardly begun. It is not possible to give a scientific answer to questions concerning the normal development of East African children and the extent to which it differs from the development of children in other countries. During the past four years, H. McAdam and K. J. McAdam have been working in this field at the Institute of Education, Makerere University College, Kampala, Uganda. With the help of the Nuffield Foundation, a nursery school has been built and operated. Children from a wide sample of social levels have been selected, each being matched with a child not attending the experimental school. The aim of this project is to study the development of East African children aged three to six.

Measurement

There are at present no highly refined standardized tests of intelligence, aptitude, or achievement. Isolated attempts have been made to construct local tests and to adapt tests devised for other countries. For example, Y. K. Lule, formerly of the Institute of Education, Makerere University College, produced a nonverbal test of intelligence. Some aptitude testing has been done at the Training School of the East African Railways and Harbours Administration in Nairobi. An inquiry into aptitude testing for selection for technical education has been begun in Uganda by O. Roberts of the National Institute of Personnel Research, Johannesburg, Union of South Africa.

Educational Sociology

Several research studies on the social setting of education are under way in Uganda, most of them in a fairly early stage. The Ford Foundation

has contributed funds for a study at the East African Institute of Social Research. This study, under K. A. Maleche, aims to discover what happens to school-leavers who drop out of school at various levels. Maleche's study includes the problem of students who repeat classes. In many classes, up to 25 percent of the pupils are repeaters. This seriously reduces the number of places available for pupils coming up from below. Also financed by the Ford Foundation is an inquiry by R. L. Thomas into the manpower needs of industry in Uganda. The primary objective of this investigation is the improved planning of technical education. The International Cooperation Administration is financing a study by E. R. Alexander and B. C. Davis of the teaching of agriculture in Uganda and its relationship to the economy of the country.

Curricula

A great deal of classroom experimentation has been done in the field of curriculum development. In almost every case, strictly controlled testing has not been carried out. One reason is the shortage of people with research qualifications, but even where the qualified individuals exist, execution is difficult. There is heavy pressure on the time of the small cadre of well-qualified people. Changes of staffing are frequent. A classroom experiment will often run through three different supervisors and three different classroom teachers in the course of a single year. The lack of such basic information as age and IQ of the pupils is another problem. The extreme variation of conditions between the more backward and the more advanced portions of each nation means that findings in one place may be quite inapplicable in another. And there is such a wide range of ability among the teachers that such factors as size of class, language employed as a medium of instruction, and methods of instruction often produce very small variations in experimental results, compared with the vast variations between the results of a good teacher and a poor one.

A few representative examples of curriculum-development work are presented below. At the Institute of Education, Makerere University College, H. Creaser has worked on the teaching of science, particularly at the seventh and eighth years of school. Attempts have been made to infuse a spirit of inquiry and observation into the students and to use only apparatus which could be made cheaply and easily from local materials.

G. Hyslop, now of the Kenya Inspectorate of Schools, has experimented widely in the use of African music in education. Abel Sang (1958) conducted an experiment in teaching verse to African pupils. Under the Commonwealth Education Program, J. I. F. Levaque is investigating the teaching of handicrafts in Uganda. At the government teacher-training center in Mpwapwa, Tanganyika, an investigation is going on to determine the basic Swahili vocabulary of the pupils in the early school years, to serve as a guide in the production of primary-school reading material.

A start has been made by A. K. French of the Institute of Education of Makerere University College on the study of visual communication. He finds that students have serious difficulties in picture interpretation, particularly in allowing for perspective, reduction to monochrome, light and shade, and other effects. Even simple conventions for the description of pictures are not well established. The use of pictures of concrete situations as symbolic of abstract concepts such as cooperation is often not grasped. Researchers hope to experiment with methods of systematic training in visual comprehension which could be used either initially or remedially.

Most investigations involving the curricula are done in teacher-training colleges, especially in the larger government institutions such as Kagumo and Siriba in Kenya; Butimba, Morogoro, and Mpwapwa in Tanganyika; and Kyambogo in Uganda. The inspectorates often play a prominent part in initiating such work and disseminating results. The knowledge gained is also disseminated through professional journals, such as the *Kenya Education Journal* and the *Uganda Teacher's Journal*, through improvements in the official curricula, through teacher training, through refresher courses for teachers, and through the publishing of textbooks and teachers handbooks.

Language Problems

Of outstanding importance in East Africa is the language problem. More than 100 languages are spoken in the area, and more than 20 are used for instruction in schools. For cultural and economic reasons, most of these languages run out of reading material at an early stage, so that education has to transfer to a second and sometimes even a third language. English is used as the medium of instruction in the upper levels of the educational system. There is a tendency for its use to be started at lower and lower levels. Two educational-research projects in East Africa are concerned with this problem.

In town schools attended by children speaking many different languages, a lingua franca is needed from the very beginning of school. Swahili is often used in this situation. In 1957 the Kenya Education Department set up a special center to experiment with the use of English as a medium of instruction from the beginning of school. The Ford Foundation has assisted in this project.

Perren (1958) and C. O'Hagan showed that English could be successfully used as a medium of instruction, beginning with children who knew no English. So far the experiments in Kenya have dealt only with Asian pupils. At a smaller special center which has been established in Uganda, similar investigations have been carried out with both African and Asian children. Children learning English through daily use in play and learning activities make dramatically faster progress with the language than those who only use it in the daily English lesson. It is not surprising, for this and other reasons, that some observers see the adoption of the English medium as the future pattern of East African education.

The fact remains, however, that there are a number of important language groups spoken by the great majority of the East African population, who will not relinquish quickly the use of their own language as an educational medium. For them the existing pattern is the initial study of English as a subject and then a change to English as a medium. At present this change takes place at about the seventh year of school. It is generally abrupt and not preceded by any special preparation. The central research problem is how to facilitate the change. This problem is being studied at the Institute of Education, Makerere University College (1958, 1959, 1960, 1961), with the help of the Nuffield Foundation, under the direction of J. A. Bright, M. Mosha, and P. G. Wingard.

Attention was first focused on the problems of the first two years of the study of English. The emphasis has recently moved to the use of English as an educational medium. Attempts are being made to record the language used when English first becomes the medium of instruction. It is hoped to have this material analyzed linguistically. This very large undertaking will necessitate calling on resources in America and Britain. It is then hoped to incorporate the essential language items into the English course of the years preceding the change. This problem has many complications, and several other facets are currently being studied through controlled experiments on a limited scale. Examples are the use of group methods in teaching English, the effects of a more gradual change to the English medium, and the effects of linguistic simplification of reading matter on comprehension.

Bibliography

- ABEL SANG (pseud.). "Poetry's Sweet Compulsion." *Kenya Education Journal* 1: 27-29; November 1958.
- MAKERERE UNIVERSITY COLLEGE, INSTITUTE OF EDUCATION. *Nuffield Research Project in the Teaching and Use of English in African Schools, Third Progress Report*. Kampala, Uganda: the Institute, 1958. 60 p. (Mimeo.)
- MAKERERE UNIVERSITY COLLEGE, INSTITUTE OF EDUCATION. *Nuffield Research Project in the Teaching and Use of English in African Schools, Fourth Progress Report*. Kampala, Uganda: the Institute, 1959. 22 p. (Mimeo.)
- MAKERERE UNIVERSITY COLLEGE, INSTITUTE OF EDUCATION. *Nuffield Research Project in the Teaching and Use of English in African Schools, Fifth Progress Report*. Kampala, Uganda: the Institute, 1960. 38 p. (Mimeo.)
- MAKERERE UNIVERSITY COLLEGE, INSTITUTE OF EDUCATION. *Nuffield Research Project in the Teaching and Use of English in African Schools, Sixth Progress Report*. Kampala, Uganda: the Institute, 1961. 55 p. (Mimeo.)
- PERREN, G. E. "Bilingualism or Replacement." *English Language Teaching* 13: 18-22; October-December 1958.

CHAPTER VII

French-Speaking Countries: Belgium, France, and Switzerland

FERNAND HOTYAT and GASTON MIALARET

ONE OF THE MOST STRIKING characteristics of the development of, and research into, education in French-speaking countries is the diversification of professional backgrounds of individuals who are actively participating. The disciplines of medicine, sociology, and psychology have displayed a keen interest in education.

The doctors view the child as a complex of physiological components and contribute to discussions on educational matters by warning schoolmasters against the dangers of harmful overwork and useless fatigue associated with an unfavorable division of working hours during the day; they also point out the need to organize life so that the fundamental rules of health can be observed. Some doctors go beyond general school considerations and try to solve purely scholastic problems on the basis of physiological considerations alone. Instances are to be found in the writings of Callewaert (1954) and Ajuriaguerra and Auzias (1960).

The sociologists, for their part, emphasize the importance of the living conditions of the child and the role played by the social structure in success at school. Their methods of investigation assist the teacher and throw a special light on problems that have hitherto seemed due solely to the personality of the child. The gradual introduction of sociology into the training of teachers will enable educationists to more easily view school problems against the complex of civilization as a whole, both historically and geographically.

It cannot be said that psychological problems have been discovered recently by educationists, but it is true that greater emphasis has been laid on the psychic life of pupils. The school child is no longer looked upon just as a unit but as a child whose life extends beyond the narrow confines of the classroom. The educational psychologist cannot yet say that he is completely satisfied with the place psychology holds in school life and in the training of educators, but there is no doubt that all French-speaking countries are witnessing a renewal of interest in the problems of psychology. There are many studies seeking to analyze the psychological processes underlying school activities, such as the work of Hotyat (1959) in the psychology of arithmetic and mathematics and of Wittwer (1959) in the learning of the mother tongue.

Research which follows scientific principles is gradually gaining ground in the search for solutions to problems. Since 1953, several research centers have been joining together to share their experience. L'Association

Internationale de Pédagogie Expérimentale de la Langue Française was founded in 1958 with the purpose of further coordinating activities and promoting the advance of educational research. The Association has several national centers (at Geneva, Paris, and Caen); it hopes to extend its activities to all French-speaking countries, whether in Europe, the Americas, or Africa. The results are very encouraging. The joint action of its members (who are at one and the same time educators and research workers) has developed the scope of sociopsychological studies and has resulted in an ever-growing ease of cooperation among scholars in different disciplines.

Curriculum and Instruction

Research in the area of curriculum and instruction has been given heavy emphasis in recent years. Although it has generally followed subject-matter areas, it has also focused on teaching techniques and materials. Noticeable, too, is an interest in special curricular materials and techniques for those children who do not fit into the normal groups of the school population as a whole: deficient children, handicapped children, and maladjusted children of every kind. The amount of research on exceptional children has increased considerably since World War II, and practical progress is evident both quantitatively and qualitatively.

French Grammar

The formal rather than the expressive aspects of the French language have occupied the attention of research workers during the past five years. Studying the didactics of grammatical analysis, Wittwer (1959) called attention to two opposite systems of teaching. The traditional method teaches the child the formal terminology, in the hope that his understanding will later increase. The modern method teaches the children to recognize the functions of the parts of a clause without the use of a scientific vocabulary, with the transition to the conceptual stage taking place only at the age of about 11 or 12. To compare the effectiveness of the two methods, the author gave pupils, aged 8-14, eight series of 10 sentences each (four series according to the traditional manner and four series according to the modern approach), in which they had to point out the subject, the object, or the complement. The results of these two groups of tests barely differed for the subject and the object, but achievement was significantly higher in the modern series for the complement.

After an investigation of the weakness in the spelling of homonyms shown by pupils entering an apprenticeship center, Delchet (1957) compared the effectiveness of a partially individualized method containing forms for self-correcting with the customary method of dictation. After two years the results were better for the group using the individualized plan, but the difference was not significant.

Mathematics

Administrators and teachers have been most urgently seeking new methods in the field of mathematics. The departments of education are trying to foster new ventures. The Ministère de l'Instruction Publique (1959, 1960) (the Belgian Ministry of Public Education) has published, respectively, two reports: (a) a summary of an exchange of views between teachers and inspectors of France and Belgium and (b) a practical work on the manual production of models to assist pupils to understand geometrical forms, to stimulate abstract thought, or to set about discovering properties and characteristics not yet taught. The Institut Pédagogique National (1960) (National Pedagogical Institute) has published a series of examples of experimental scientific work in the fields of geography, physics, and mathematics. These illustrations, discussed in their natural settings, are designed to motivate pupils to engage in research at their own level. The Institute is at present checking the results of this undertaking.

Dabout (1960) studied the learning and use of the basic arithmetic operations in whole and decimal numbers, fractions, and problems. Mialaret (1958, 1961) studied achievement in arithmetic fractions in consecutive classes of the secondary grammar schools and found that the level of grade 9 must be reached before simple exercises already introduced in the primary school can be correctly solved by more than 40 percent of the pupils.

Several works have been more concerned with the psychology of mathematics learning than with achievement per se. Hotyat (1959) confronted pupils at the beginning of grades 9 and 10 with a problem requiring determination of the surface measurement of a rectangle. Forty-six percent of the pupils in grade 9 and 70 percent of those in grade 10 came to a satisfactory conclusion through a shortening of the material experience; but among those who succeeded, there was not one in grade 9 and only 18 percent in grade 10 who were able to reach a satisfactory rule by induction. On the other hand, at grade 9, of the pupils confronted with situations employing the reverse problem of finding a dimension, 97 percent spontaneously succeeded in shortening the experiment and 84 percent succeeded in finding a rule. Finally, the author found that, of the pupils in grade 9 and grade 10 who had discovered what to do on a surface divided into square centimeters, very few showed themselves able to apply the solution they had found to rectangles of square decimeters.

Social Studies

Burki (1958) analyzed answers on 12,000 written examinations in order to determine the level of education in civics among the young Swiss. The questions were both factual and interpretative. Among the examinees who

had left school at the end of compulsory education, those who had given up any attempt to continue their education obtained right answers to only 36 percent of the items; whereas those who had taken supplementary courses in practical vocational training were correct in 63 percent of the questions. Although the average level of success was lower for questions involving problem-solving skills than for those involving factual knowledge, the amount of previous education had a strong and consistent relationship to successful performance in all phases of the examination.

Gal (1956) gave an account of the French share in UNESCO's experimental project for international understanding in high schools. Two forms of action were taken in France: (a) the permeation of all suitable courses with the idea of human brotherhood and (b) a special study of the history of slavery. The evaluation, which consisted of surveying the opinions of pupils about relationships with foreigners, employed material more or less subjective in nature.

Production of Teaching Materials

To increase the impact on the school, some research workers tried to use the results of their studies to produce teaching aids more directly suitable for class use. For example, after he had already schematized the difficulties of the French conjugations, Roller (1955) produced conjugation tables for use in teaching at Geneva.

At the request of the Inspectorate, the Institut Supérieur de Pédagogie de Hainaut (1961b) (the Higher Educational Institute, Hainaut) in Morlanwelz, Belgium, arranged to test pupils in the fifth and sixth years of school by means of a selection of 15 exercises in silent reading, drawn from various types of subject matter and presenting a range of difficulty in relation to the level of the child. The tests were modified and improved after a first trial on 450 pupils, and the percentage of success for each item in the final version was found after another sampling.

In arithmetic, Roller (1960a) has prepared materials for pupils in the upper level of primary schools to help them attain mastery of the multiplication table through memorization and self-checking. His research into the subject began with four timed tests involving a knowledge of the 100 products of the tables. The number of correct replies made in 90 seconds was marked on a scale ranging from 1 to 100. Another set of materials consisted of six workbooks so arranged as to allow the children to check their own answers. After the first test had been completed, all the pupils were given the first workbook in which the questions were graded by difficulty. Then the second test was given. Pupils whose scores fell in the top quarter of the scale continued to the second workbook (not graded for difficulty) and a self-check test. Pupils whose results had fallen below the top quarter had to go through a second and perhaps a third workbook until the tests showed that their achievement ranked in the top quarter of the scale.

The Institut Supérieur de Pédagogie de Hainaut (1961a) designed a battery of analytical arithmetic tests to be taken at the beginning of post-primary education. Five workbooks were prepared in which each difficulty level was repeated three times. They covered written arithmetic calculations, mental arithmetic, fractions, the metric system, geometrical forms, and arithmetic problems. After a pretest, the final tests were held in various types of postprimary classes, and an analysis was made of errors so that they could be classified by type. Class tables were devised to show at a glance the weaknesses of a pupil and the extent to which any class had mastered each item.

Guidance and Testing

School authorities in France and Belgium have not greatly encouraged the use of psychological services at the primary-school level, and as a result there are few studies available concerning the first years of school.

Zazzo (1960b) made a wide variety of tests for use in the psychological examination of children. They encompass motor organization, in terms of both space and time, psychomotor efficiency, and personality. These tests are carefully described; the instructions and the norms are given in detail; and the possibilities of each of the tests, whether clinical or statistical, are analyzed. Similarly, Dubosson (1957) brought out both a series of exercises for the purpose of speeding up school readiness at entrance into primary school and a set of progress tests having special reference to perception and sensory-motor development.

The growing importance of, and differentiation in, secondary education have led to much research on pupil selection at this level. An inquiry by Pasquasy (1956) conducted among teachers suggested important attitudinal changes. For example, 77 percent of the replies stated that the present examinations did not achieve their purpose, and 51 percent wished for tests to be made a part of the admission process.

Guiret-Seuxa and Reuchlin (1958) recorded the marks of 1000 candidates for admission to five secondary schools in Paris taken at random over a period of two years and found variation in the standards set by examiners and inequities in the weighting system for examinations.

Roller (1960b) studied the validity of aptitude tests taken by students between 1946 and 1951 at the end of their primary schooling relative to a criterion of achievement in secondary school. In light of the limited predictive value of the tests, Roller believed that, in general, an examination of the pupil's school record would provide grounds for a better forecast.

Delys (1957) was especially interested in constructing tests for use at the time of admission to higher education. Two tests, one in mathematics and one in the mother tongue, were employed together with the customary examination for admission to the Belgian Ecole Militaire. The biserial coefficients of correlation between these tests and passing marks in the customary examinations were as follows: mother tongue, .41 and .40; mathematics, .58 and .64.

There is an increasing output of achievement tests, and their quality is improving; mention need be made of only a few of the more important ones. Halconrui (1960) published a test of silent reading to assess the speed of comprehension of children aged 9-12. Burion (1958) developed three tests of oral reading in parallel form for use in the first three years of school. Testing lasts two minutes; standards are given for speed and correctness; and a qualitative scale is established on the basis of these criteria.

Reuchlin (1958) conducted a broad inquiry into pupil knowledge of the mother tongue and of arithmetic at the end of the primary school (grade 5). A sample of 4860 pupils was carefully chosen from the entire country. The tests, which were given by 200 vocational-guidance counselors, consisted of two parts. One contained questions on arithmetic computations, the metric system, and arithmetic problems; the other consisted of dictation, grammar and spelling questions, sentence analysis, conjugations, and reading comprehension. The chief findings were as follows: (a) the average level of pupils preparing for secondary education was slightly higher in urban centers than in the rural areas, and (b) the level of attainment of one-half of the pupils who were not preparing for secondary education was comparable to that of the group preparing for secondary education.

The Institut Supérieur de Pédagogie de Hainaut (1961a) compiled and analyzed the records of 629 children in their first primary year, drawn from a sample of 29 classes. The records covered the results of intelligence tests when they entered, information about their family background and school life, and results of achievement tests given at the end of the year. Of the children failing at the end of the school year, 75 percent were weak in all subjects; the remaining 25 percent failed in reading and writing rather than arithmetic. The results of the intelligence tests had only a slight predictive value for school achievement. Other factors affecting success or failure were absenteeism and the cultural and socioeconomic level of the family. (The failure rate rose from 5.5 percent for families of high socioeconomic status to 47.5 percent for indigent families.)

Working at the same Institute in 1956, Matchabely and Hotyat (1957) gave 759 pupils in their sixth year of study the same achievement test as had been used 10 years previously in the same areas. The chief findings were the following: (a) Despite a slight decrease in the range of the intelligence-test scores, largely attributable to an influx of foreign miners to the area, the results of the achievement tests were significantly higher ($p < .01$) than in 1946. (b) Progress was most clearly shown in composition, spelling, free-choice passages, and reading comprehension.

Child Growth and Development

Working in an area characterized by a long tradition and much background data, Zazzo (1960a) made a critical study of twins to determine

the relative influence of heredity and environment on development. The author asserted that twin comparisons typically are distorted because they fail to take into account certain essential data, such as the great frequency of abnormally low birth weights of twins. Far from being fixed, the relationship between genetic and nongenetic factors changes during development, especially with regard to the most complex mental functions; the differences between homozygotic twins, in particular, increase during prepuberty and puberty. The author concluded that heredity and environment should not be considered as opposed one to the other, nor as additive, but as continually interacting.

Burstin (1959) analyzed the replies made by boys and girls aged 10-13 to a questionnaire about themselves, about their surroundings, and about changes that they would like to see. The author declared that a 10-year-old child focuses on concrete objects, sees the social and human aspects of the world in a syncretic form, and, at first, values physical appearances. Later his judgments are structured by his companions. Finally he discovers the freedom enjoyed by adults at the same time as their influence on him is waning. Entering adolescence, he finds that the way to self-assertion is open.

François-Unger (1957) made a penetrating study of the development of 24 maladjusted adolescents who were war orphans. Starting from the assumption that their symptoms of anxiety or aggressiveness were the natural results of the tragedy in which they had been innocent victims, the author founded and directed an educational—not therapeutic—establishment in which the milieu was adjusted to individual needs. The main educational problem was how to lead the orphans not to forget their past but to accept it as a part of themselves. The conditions necessary to success were found to be the following: (a) the confrontation of the pupils with their responsibilities, rather than overprotection; (b) the creation of an atmosphere in which the children are encouraged to manage their own affairs and to cooperate; and (c) the choice of some vocational path in which the adolescent can achieve success.

Leisure Activities

The objective study of the free-time occupations of children and adolescents, and particularly of their educational values, has been taking an increasingly important place in recent research.

Benassy-Chauffard and Pelnard (1958) made use of the method of personal interview followed by an inquiry directed toward the family and the employer in their study of the leisure time of Parisian apprentices. They found that the leisure occupations of these young people, which reflected their psychological and social needs, were of a compensatory nature. Of the leisure occupations reported, 28 percent were of cultural interest, 50 percent sporadic, and 21 percent really active. Classifying

results according to the degree of sociability involved, the authors found that 17 percent were isolated (as against 27 percent gregarious), and 56 percent were not systematically oriented in either sense. Dumazedie and Hassenforder (1960) concerned themselves with the attempts made by adults to acquire fresh knowledge. They obtained their data from 500 heads of families sampled by a systematic sorting of 5 percent of the population of a town of 40,000 inhabitants. The replies showed few subjects of pronounced interest, except for practical questions, technical matters, and geography. The most-used sources of reference were periodicals and, to a lesser degree, special articles in newspapers. An inquiry among adolescents aged 13-16 revealed to these authors that 50 percent of the boys and 60 percent of the girls were very fond of reading—especially the reading of illustrated magazines. Other inquiries showed that young people preferred to use whatever suitable school libraries existed.

Halsberghe (1958) took a special interest in children's reading. He made a collection of more than 500 books of various kinds, which he put within the reach of the children in such a manner that all were equally accessible for periods of a fortnight in a boarding school and in holiday camps. He was thus able to list the preferences according to age and came to a great number of practical conclusions about how to choose and present books. Although the children had no supervision, there was virtually no disorder and no misappropriation. Halsberghe believed that the arrangement and furnishing of children's libraries should be entirely changed and offered a number of suggestions on the matter.

Teaching Personnel

Limbosch (1956) used the critical-incident technique with 10 principals of primary schools. Although the number of replies was small, the author believed that the methodology was very promising and that its use would lead to a verification of the factors in the teaching function and to the formulation of suggestions regarding procedures to employ for the better understanding and better training of teachers.

Mialaret (1959) analyzed the information he had collected for a personality study of the students in a national training college for vocational-education teachers. The author was in charge of educational-psychology courses for future mathematics teachers. He made use of autobiographical information and interviews. The author saw these new teachers again after a year or two of teaching to find out what qualities they displayed in their profession and how they had adapted themselves to the teaching world. Although this research study involved only a few persons, it was especially noteworthy because of the method it employed. It suggested that research on the likelihood of success in the teaching profession should be reformulated on the basis of examination and without reference to any *a priori* personality theory. It also suggested that the professor of teaching

methods would be the best counselor for a beginner, because he could give the student substantial assistance in overcoming such obstacles and crises as are frequent at the beginning of a career.

Bibliography

- AJURIAGUERRA DE, J., and AUZIAS, H. "Méthodes et techniques d'apprentissage de l'écriture" (Methods and Techniques for Learning Handwriting). *Psychiatrie de l'enfant*, 3(2), 1960. p. 609-718. [Important bibliography.]
- BENASSY-CHAUFFARD, C., and PELNARD, J. "Loisirs de jeunes travailleurs, reflets ou compensation des caractères psychologiques et sociaux." (Recreation of Young Workers: Compensations for Psychological and Social Characteristics). *Enfance* (Paris). No. 45, 1958. p. 381-405.
- BURION, J. "Un test de lecture orale" (A Test of Oral Reading). *Revue belge de psychologie et de pédagogie* (Brussels). No. 82, 1958. p. 40-52.
- BURKI, F. *Rapport sur les examens pédagogiques des recrues en 1957* (Report on the 1957 Pedagogic Examination for Recruits). Enquête sur la préparation de la jeunesse suisse à la vie civique, 1958. p. 5-32.
- BURSTIN, J. *L'évolution psycho-sociale de l'enfant de 10 à 13 ans* (The Psycho-Social Development of the Child Between Ages 10 and 13). Neuchâtel: Delachaux et Niestlé, 1959. 227 p.
- CALLEWAERT, H. *Graphologie et physiologie de l'écriture* (The Graphology and Physiology of Handwriting). Louvain: Nauwelaerts, 1954.
- DABOUT, M. "Recherche sur l'acquisition et l'utilisation des connaissances et mécanismes de base en mathématiques à l'entrée en sixième" (Research on the Acquisition and Use of Mathematical Principles and Knowledge at the Beginning of the Sixth Form). *Courrier de la recherche pédagogique* (Paris). No. 11, 1960.
- DELCHET, R. "Étude expérimentale de la permanence de certaines acquisitions grammaticales dans les centres d'apprentissage" (Experimental Study of the Permanence of Certain Grammatical Acquisitions in Apprenticeship Centers). *Courrier de la recherche pédagogique* (Paris). No. 7, 1957. p. 19-32.
- DELYS, L. *Inventaire des connaissances acquises en fin d'humanités* (Survey of Learning Acquired at the End of the Humanities Course). Louvain: Centre national de recherche de psychotechnique, 1957.
- DUBOSSON, J. *Le problème de l'orientation scolaire* (The Problem of Academic Orientation). Neuchâtel: Delachaux et Niestlé, 1957.
- DUMAZEDIE, J., and HASSENFORDER, J. "L'instruction et les masses" (Teaching and the Masses). *Courrier de la recherche pédagogique* (Paris). No. 12, 1960. p. 3-40.
- FRANÇOIS-UNGER, B. *L'adolescent inadapté, réadaptation sociale et formation professionnelle* (The Maladjusted Adolescent: Social Readjustment and Professional Development). Paris: Presses universitaires de France, 1957.
- GAL, R. *Une expérience d'éducation civique internationale* (An Experiment in International Civic Education). Paris: Service d'édition et de vente des publications de Ministère de l'éducation nationale, 1956. 48 p.
- GUIRET-SEUXA, M., and REUCHLIN, M. *Étude sur l'examen d'entrée en sixième dans cinq établissements parisiens* (A Study of the Sixth Form Entrance Examinations of Five Paris Schools). Bulletin de l'I.N.O.P. (Paris), 1958.
- HALCONRU, R. "Un test de lecture silencieuse" (A Test of Silent Reading). *Courrier de la recherche pédagogique* (Paris). No. 12, 1960.
- HALSBERGHE, C. *Enquête sur la lecture enfantine* (Investigation of Children's Reading). La Louvière, recentre, 1958. No. 1, p. 83-111.
- HOTYAT, F. "À quel niveau enseigner la mesure de la surface du rectangle?" (In Which Grade Should We Teach the Measurement of the Surface of the Rectangle?). *Revue belge de psychologie et de pédagogie* (Brussels). No. 86, 1959. p. 53-63.
- INSTITUT PÉDAGOGIQUE NATIONAL. *Les travaux scientifiques expérimentaux* (Experimental Scientific Projects). Paris: Ministère de l'éducation nationale, 1960.
- INSTITUT SUPÉRIEUR DE PÉDAGOGIE DE HAINAUT. *Epreuves analytiques à l'entrée de l'enseignement post-primaire* (Analytical Tests at the Beginning of Post-Primary Education). Morlanwelz: Publication de l'I.S.P. du Hainaut, 1961. (a)

- INSTITUT SUPÉRIEUR DE PÉDAGOGIE DE HAINAUT. *La lecture silencieuse du degré supérieur de l'école primaire* (Silent Reading for the High Degree in the Primary School). Morlanwelz: Publications de l'I.S.P. du Hainaut, 1961. (b)
- LIMBOSCH, N. "Analyse de la fonction d'instituteur par la méthode de l'incident critique" (An Analysis of the Teacher's Function by Means of the "Critical Incident" Method). *Revue belge de psychologie et de pédagogie* (Brussels). No. 74, 1956. p. 69-87.
- MATCHABELY, K., and HOTYAT, F. "Le niveau scolaire en Hainaut à dix ans d'intervalle" (The Academic Level in Hainaut at Ten-Year Levels). *Revue belge de psychologie et de pédagogie* (Brussels). 1957. p. 72-84.
- MIALARET, G. "Recherche sur la pédagogie des mathématiques" (Research on the Pedagogy of Mathematics). *Bulletin de psychologie* (Paris). 1958. p. 1-12.
- MIALARET, G. *Étude sur la formation des professeurs de mathématiques* (Study of the Development of Mathematics Teachers). Paris: Centre national de la recherche scientifique, 1959. 77 p.
- MIALARET, G. *Psycho-pédagogie de la lecture* (The Psycho-Pedagogy of Reading). Caen: Laboratoire de psycho-pédagogie, 1961. 168 p.
- MINISTÈRE DE L'INSTRUCTION PUBLIQUE. *L'initiation aux mathématiques: Problèmes psycho-pédagogiques* (Introduction to Mathematics: Psycho-Pedagogical Problems). Brussels: Ministère de l'instruction publique, 1959. 65 p.
- MINISTÈRE DE L'INSTRUCTION PUBLIQUE. *Quelques exemples de coordination entre les cours de travaux manuels et de mathématiques* (A Few Examples of the Coordination of Courses in Mathematics and in Manual Work). Brussels: Ministère de l'instruction publique, 1960. 39 p.
- PASQUASY, R. *Le problème des examens d'entrée dans l'enseignement "moyen"* (The Problem of Entrance Examinations in "Middle" Education). Liège: Dessain, 1956.
- REUCHLIN, M. *Enquête nationale dans les classes du cours moyen, deuxième année* (National Survey of "Middle" Course Classes, Second Year). Bulletin de l'N.O.P., 1958.
- ROLLER, S. *La conjugaison française* (Conjugations in French). Neuchâtel-Paris: Delachaux et Niestlé, 1955.
- ROLLER, S. *Acquisitions de la table de multiplication* (Acquisitions to the Multiplication Table). Genève: Centre d'information de l'union des instituteurs, 1960. (a)
- ROLLER, S. *L'évolution scolaire des items* (Academic Evolution of Items). Genève: Rapport sur la réforme de l'enseignement, 1960. p. 47-123. (b)
- WITTWER, J. *Les fonctions grammaticales chez l'enfant* (The Child's Grammatical Functions). Neuchâtel: Delachaux et Niestlé, 1959. 295 p.
- ZAZZO, R. *Les jumeaux, le couple et la personne*. T.1. "L'individuation somatique"; T.2. "L'individuation psychologique." (Twins, the Couple, and Personality: Vol. 1: Somatic Individuation; Vol. 2: Psychological Individuation). Paris: Presses universitaires de France, 1960. 742 p. (a)
- ZAZZO, R. *Manuel pour l'examen psychologique de l'enfant* (A Manual for Psychological Testing of the Child). Neuchâtel-Paris: Delachaux et Niestlé, 1960. (b)

CHAPTER VIII

West Germany

LUDWIG VON FRIEDEBERG

SO FAR AS SCIENTIFIC questions of content and pedagogical questions of instructional methods are concerned, no other subject taught in the high schools is so deeply influenced by social factors as political education (the term "political education" being very broad in meaning to include content found in high-school subjects of civics, government, and history). During the past 50 years, teachers in Germany have had to make their pupils familiar with no fewer than five different political systems, only one of which—constitutional monarchy, as it existed at the beginning of the century—could claim the advantage of possessing long-established and unbroken traditions. However, even the early days of political instruction, during the reign of Wilhelm II, brought home the fact that the school was required to provide civic instruction only in cases—and in all cases—where parents could no longer be relied upon to develop in their children an attitude toward the state and the community corresponding to the existing system of government. The efforts made by the imperial authorities to develop a national and monarchist spirit among pupils can be regarded as a reaction against socialist and international tendencies directed toward changing the existing form of society.

During the First Republic, after World War I, there was more frequent occasion, indeed, to enlist the cooperation of the school as an educational institution; but this was done in the face of various forms of resistance, which existed even in the schools themselves, and official civic instruction had little success in developing among the pupils that republican feeling which constituted its educational objective. The Hitler regime aimed at coordinating all schools and required teachers to indoctrinate their pupils with national-socialist ideas. Although political education in the true sense of the term received little attention as a subject of instruction in most high schools, the educational principles applied by the Hitler regime did match the traditionally authoritarian school system and the social outlook of many teachers far more closely than did the educational aims of the impotent Weimar democracy.

Post World War II Political Education

Today, as a result of this checkered history and its dire consequences, two different kinds of political education are imparted in either part of divided Germany: social education or civics for pupils in the Federal Republic, organized on a representative and democratic basis; and dialect-

tical materialism for pupils in the East German Democratic Republic, with its Eastern European stamp. The problems of political education in Germany are those of that country's political and social development.

The empirical surveys which form the subject of the present report were concerned with the conditions and results of this experimental teaching. In view of the multiplicity of aims of political instruction in the various *Länder* of the Federal Republic and of the gap existing between the ministerial decrees and the extremely varied methods of teaching this subject in the schools, the immediate purpose of the studies in question is to take stock of the existing situation. As a contribution to critical research in the fields of social science and education, however, the studies are designed to promote an improvement of the unsatisfactory situation described.

Ever since the adoption in June 1950 of the resolution of the Permanent Conference of Ministers of Education and Religious Affairs concerning the Provisional Principles of Political Education, political instruction has been compulsory in all *Länder* of the Federal Republic. This resolution signalized political education as an *instructional principle* for all branches of instruction and all types of schools. The schools were called upon, according to their nature and possibilities, (a) to stimulate among pupils, on the basis of factual knowledge, an active interest in political thought and action and (b) to thus foster among the youth the consciousness that political behavior forms part of the general intellectual and moral behavior of man. With a view to ensuring the provision of knowledge concerning the main facts and forms of social, state, and suprastate life and their interrelationships, as well as the discussion of current questions, the Permanent Conference recommended that political instruction should be given from the seventh school year onward as a *special subject*. The name to be given to this subject was left optional, and the following names were suggested in the order given: *Gemeinschaftskunde* (social studies), *Bürgerkunde* (civics), *Gegenwartskunde* (contemporary studies), and *Politik* (politics).

Regarding teaching methods, it was merely indicated that the instruction given should bear the closest relation to the pupils' everyday lives and should be facilitated by the pupils' community lives in the school, particularly their participation in school administration. Instruction should further be facilitated by free discussion and by visits and lectures, giving pupils insight into the activities of administrations, courts, and parliaments.

The Ministers hoped that political education along these lines, with its concept of "politics" left undefined and its relation to democracy left implicit, would inspire pupils with a real public spirit, a sense of responsibility, and a readiness to take an active part in shaping national and international public life. The teachers, it was considered, should be suitably trained and developed for carrying out this task.

The stimulus provided by this well-intended, but in no way binding, resolution could hardly be expected to be very potent. During the ensuing

years, it was left to the Ministries of Education and Religious Affairs to clarify the abstract principle of political education and to organize this new branch of instruction as well as the training of the teachers to whom it was to be entrusted. Moreover, it was left to teachers willing and qualified to implement the program to introduce this instruction into existing school practice.

The Ellwein Report

Under the auspices of the Political Sciences Institute of the Munich College of Political Sciences, Ellwein (1955) drew up a report at the beginning of 1951 on the initial stage of political education in high schools in the Federal Republic. The material was based (a) on a comparative study of the various syllabi; (b) on the results of a questionnaire sent to the high schools and to some of the pedagogical institutes, teacher-training colleges, and similar establishments; and (c) on the information obtained during classroom visits and talks with the principals and pupils. The object of this first empirical survey was to obtain a general picture of the way in which political education had so far been imparted in the high schools, but the necessary means were lacking to enable it to cover systematically the teaching of this subject throughout the whole of the Federal Republic. Nevertheless, this insight into school practice, although obtained mainly through the written reports of principals and teachers on the subject, provided valuable information concerning the different aims and the varying degrees of development of political education in individual *Länder* during the period concerned.

Ellwein observed that political education would be meaningful only when democracy is practiced out of school and when the school itself and all its teachers are conscious of serving this democracy. Moreover he maintained, on the basis of his material, that when it came to political education, considerable misgivings from the political and didactic standpoints were to be expected on the part of teachers. The fact that a few "intractable" teachers were opposed to democracy in principle was less important than the widespread skepticism regarding political education in the face of the shortcomings and vexatiousness of the German state administration, including its school administrations which had given cause for criticism. Furthermore, it was widely feared that political education would be detrimental to the performance of fundamental tasks as well as to the observance of certain long-established school traditions and to the authority of the teachers. Other teachers, though favorable to the new developments, declared themselves unqualified to teach the subject because of the lack of suitable training. Moreover, it was particularly pointed out that the range of the syllabus would impose excessive demands on the teachers.

Provision for political education had so far not been carried into effect to any appreciable extent or systematically incorporated in school work. History teaching, on which great hopes had been set, made no contribu-

tion to political education apart from touching occasionally on recent events. The need to institute political education as a special subject, as has been done in only a few *Länder*, was just as obvious as the urgency of providing special training for the teachers who were to be entrusted with this subject.

The Hilligen Study

The inadequate training of teachers was also noted by Hilligen (1955) in a study on progress and planning in civics teaching, which was published at the same time under the auspices of the Frankfurt Institute for International Educational Research. This study was based on (a) a survey of the contents and methods of political instruction in 141 classes covering grades 7-10 (1951-53) in nearly all the *Mittelschulen* (secondary schools) in Hesse, (b) the answers to questionnaires sent to the civics teachers of these classes, and (c) a rather dubious selection of final-year (1953) intermediate-school children—mainly pupils of Frankfurt schools. Although it did not relate to higher levels of education, the survey deserves attention as the only comprehensive empirical survey on political education during the period concerned, particularly in view of its systematic analysis of school practice and of the fact that it was carried out in a *Land* which had promoted the organization of instruction from the very outset.

The respondent intermediate-school teachers of Hesse expressed the view, almost without exception, that there was a need for political instruction as a special subject. While the school syllabus prescribed three to four hours of weekly instruction in this subject, the average time devoted to it in the classes covered by the survey amounted to barely two hours a week. Eighty-six percent of the civics teachers had had to take charge of the subject without any previous training for the task. It was only rarely that the difficulties experienced in political instruction were attributed by teachers to lack of interest on the part of the pupils, to the authoritarian atmosphere in the school, to the unfavorable influence of the home and of public life, or to their own political experience under the Hitler regime. They took the view, rather, that these difficulties were mainly traceable to problems of school organization, such as excessively large classes, the overburdening of teachers, or the inadequate training of teachers in the subject concerned. It was found that teachers not only had a far from satisfactory factual knowledge of the subject but also lacked the necessary teaching skill for this new and difficult branch of instruction. Many teachers neglected what Hilligen termed the social-pragmatic aspects of the problem, either because they overestimated the pupils' ability to comprehend social ideas or because they felt that the school should teach more easily assimilable knowledge in view of what they regarded as the latter's educative value. Almost nothing was done to give the pupils a clear conception of the social and political processes and relationships characterizing the existing social system.

Sociological Study of Frankfurt Students

The very limited success of political instruction at high schools during this initial period is described by Habermas and others (1961) of the Institute for Social Research in a sociological study on the political consciousness of Frankfurt students. During the 1957 summer semester, a sample of 107 Frankfurt University students was subject to oral interviews; while during the 1958-59 winter semester, a supplementary sample of 550 students was subject to standardized oral interviews on various matters, including civics instruction. In 1957, 81 percent of the students, many of whom came from Hesse, said that they had been given political instruction as a separate subject at high schools, for two hours a week in most cases. Of the students questioned at the beginning of 1959, 89 percent had received civics instruction—over a period of four years or more in the case of two-thirds of them.

According to these ex-pupils, the instruction given encompassed the discussion of current questions, a methodical analysis of the structure of the state, a study of legal and economic questions, and the exposition of political ideas and concepts. The group-partnership principle of *Arbeitsunterricht* (learning by doing) had failed to assert itself definitely in place of the civics teaching methods used during the Weimar period, largely because teachers had been unwilling to be deprived of the assurance afforded by the clear delimitation of the subject by the syllabus. There was the simple fact, moreover, that they still often lacked the necessary training. It was probably due more to the precarious situation of this unconsolidated subject than to resistance on the part of teachers and pupils that instruction in it not only remained isolated but also was, in many cases, eventually undermined. In any event, the instruction had left practically no impression on the minds of the respondent students. Many of the students had no concrete recollection of course content or of the manner in which it had been imparted. Whether the teacher had analyzed the Constitution or given the pupils a practical initiation into democratic forms of action, most of them had obviously not taken the instruction very seriously for the following reasons: (a) politics was not regarded as being a traditional school subject or as representing professional knowledge, and (b) the "practice" in democratic forms of action had all too often remained fruitless within the school.

Through a comparison of the reactions to other questions of students who had had a more or less extensive course of civics instruction at school with the reactions of those who had not received such training, the analysis of the probable effects of political instruction was taken a stage further. The results of both surveys showed, in any case, that students who had received civics instruction at school were generally more interested in politics than their fellow students who had not; however, the differential in interest was the sum total of the noticeable effect of civics instruction on the respondent students. Neither in their knowledge of democratic institu-

tions and current political affairs, their attitude to the democratic system, and their willingness to be politically involved, nor in their actual participation in politics, could any fundamental differences be found indicating that students who had received civics instruction at school were noticeably better informed, more democratically minded, or politically more active.

The mere fact, of course, of having been concerned in that initial period with political questions at school in connection with a particular subject provided no evidence concerning (a) the way in which instruction had been provided or (b) the influence it might potentially have. It could be that favorable and unfavorable results were exaggerated in a mass comparison—that among the respondents, the number who were discouraged by poor civics instruction was equal to the number who were stimulated by good instruction into taking an interest in political questions. Following the detailed questioning in the summer of 1957, discussions were held with those students who were not completely indifferent to politics on the way in which their interest in politics had been aroused. Of those who had studied civics as a school subject, one-third stated that their participation in politics had been aroused or strengthened by political instruction. The reactions of this group would seem to indicate the effects of political training in the most favorable cases.

The students who maintained that they had been positively influenced by civics instruction not only were more interested in politics than their fellow students but also were distinguished by their greater readiness to become politically involved and by their relatively more positive attitude toward the democratic system. It may therefore be concluded that civics instruction apparently did more in favorable cases than merely teach facts; it actually seemed to stimulate political awareness and the democratic spirit.

An examination of the students' factual knowledge clearly showed the limits of the effectiveness of political teaching. Students who had been influenced by civics instruction were better informed indeed about the formal laws governing the democratic system, such as how a law reaches the statute book; but on concrete political subjects, such as the structure of *Land* governments and the Federal Government, or questions of current social, economic, and cultural policy, their knowledge was as limited as that of the other students. There were therefore grounds for doubting whether civics instruction in its existing form, even in favorable cases where political awareness and the democratic spirit were to some extent stimulated, actually broadened the outlook on current political events. It was equally ineffective when it came to concrete political action. The authors' conjecture that political education at high schools, when not related to social realities in general, remained unrelated in the pupils' minds to day-to-day life was confirmed by the quantitative results. Students who maintained that they had been made politically conscious through civics instruction had not engaged to any greater extent than any other students in political matters, such as writing letters to members of Parliament or

participating in demonstrations and party political activities. The second survey in the spring of 1959 confirmed the absence of any effect resulting from the civics instruction on the political activities of students.

If these results inevitably led to a critical judgment of political education at the high-school level, the obvious reason was that the instruction, measured by its impact on the understanding and mastery of the facts of the political and economic world in which the students lived, failed to make its mark. The Frankfurt study left open the question of whether the ultimate causes of the limited effectiveness of civics instruction, quite apart from the problems inevitably associated with the birth of a new instructional program, should be sought mainly in specialized political education itself or rather in the fact that the impact of civics education was absorbed in interplay with competing subjects, especially philology and history.

Evaluation of Early Studies

These first studies of the initial period of political instruction at high schools in postwar Germany did not always satisfy the strict rules of experimental pedagogic and empirical social research, and the results were not generally applicable without reservation. Nevertheless, they provided copious material on the practice of civics instruction and reliable and useful information for its future development. It was Hilligen's (1955) intention, in particular, to test the usefulness of empirical research for controlling and improving school teaching and school syllabi. It is essential with a new subject that the successes and difficulties of the initial efforts should be made known and taken into account, especially when new syllabi and timetables are drawn up, for only an analysis of teaching experience can point the way to future development. In this sense, the surveys have performed pioneer work. The fact that their results have had no rapid or lasting effect is not entirely due to the lack of acceptance by most German high-school teachers and school administrations of empirical research in their own fields. The objective and subjective problems of political teaching, about which considerable documentation exists, were and still are difficult to overcome.

The 1955 Advisory Memorandum

During recent years, the Advisory Memorandum on Political Education and Training of the German Committee for Training and Education, dated January 1955, has served as a basis for the elaboration of ministerial plans and directives for political education, both at high schools and elsewhere. Unlike the original resolution of the Ministers of Education and Religious Affairs in 1950, it forthrightly names the political reality on which political education rests: *the democratic Fundamental Law as the institu-*

tional framework for a provisional West German State system in a divided Germany with which extensive areas have conditionally severed relations. It refers to the still unmastered past, to the missing democratic traditions of Germany, and to the official forms of present-day schooling and the uncertainty of parents and teachers as a result of the change in the political system and the experience of denazification. This is not meant to indicate that political education is impossible today but, on the contrary, that knowledge of present conditions shows how necessary it is.

Implication of the Memorandum

The stimulus provided by the German Committee with regard to the content and imparting of political education, both as a principle in teaching the various subjects and as a subject on its own, was reflected in a number of the plans of the Ministries of Education and Religious Affairs. However, the milk-and-water concept of politics expressed in the Memorandum, according to which the real opposition of interests between political and social groups should be regarded merely as differences in the intellectual interpretation of social phenomena, was scarcely calculated to curb the marked tendency (which the Committee had itself noticed) to shy away from real political education at school. In other words, a society riddled with opposing interests, in which politics is constitutionally conducted primarily by rival parties, finds its expression in the contradictory instructions to teachers given in the Memorandum—namely, that they should present their own political views, so that they carry pedagogical conviction, and at the same time maintain a certain distance with regard to current questions and events and avoid taking up a personal attitude. Political education of this type presupposes the existence of teachers who are ready and able to give it. When no such teachers are available, no instruction at all is preferable to a purely formal compliance with the requirements.

The 1960 Awakening

The reluctance of many schools to provide political education—not entirely due to the slow progress of teacher training—received a rude shock from outside at the beginning of 1960. An outbreak of anti-Semitic slogan-scribbling gave rise to a lively public discussion on the attitudes of young people toward the political past and toward present-day democracy. In this discussion much more responsibility for the failure to provide enlightenment was thrust upon schools and teachers than they actually deserved, in spite of many omissions on their part. The Ministries of Education and Religious Affairs in all the *Länder* where political education had so far lagged behind felt constrained to take action, and they issued proclamations and directives aimed at intensifying instruction in

politics and particularly in modern history. Whether the often abrupt change from silence about the past to its exorcism in all possible school subjects did not irritate and desensitize pupils but rather gave them food for thought was an open question.

The Fackiner and Raasch Investigation

This question and the problems of modern-history teaching were taken up by Fackiner and Raasch (1962) at the Institute for International Educational Research, in one of the two current empirical surveys on political education at high schools. The starting point of this study was to determine (a) how far the school had succeeded in overcoming the emotional and ideological links with the past which had influenced the home environment of many of the children and (b) to what extent pupils could be instilled with a positive attitude toward the democratic state, to which they not only would conform outwardly but also would accept inwardly. The purpose was to find an answer to these questions by means of written schoolroom interviews with upper 5 and 6 (grades 11 and 13) students in high schools, at which grade levels the ideology to be overcome is likely to be particularly strong among parents and teachers.

Data were obtained concerning knowledge of modern history and politics; opinions and attitudes with regard to the democratic form of government, national socialism, and anti-Semitism; the problem of world community; and the historical development of Germany.

During the autumn of 1960 and the spring of 1961, additional data from standardized-questionnaire responses of 1545 students in their eleventh year and of 1166 in their thirteenth year at 28 high schools in Hesse and Lower Saxony were obtained, although the writers questioned the statistical representativeness of the samples.

The results, which are in the process of being analyzed, should make it possible to judge whether modern history instruction and political education have created a framework within which pupils can identify themselves with their country as "a naturally existing community." The development of democracy in the Federal Republic was accompanied by sharp criticism of the German people and its history, in which the roots of the evils of the Hitler period were sought. This, it is contended, has resulted in the systematic belittling of the German people, with its submissive tolerance of authoritarian, militaristic, aggressive, and criminal leadership, and in a radical depreciation of national-mindedness. In Fackiner and Raasch's opinion, this belittlement creates a dangerous situation for teaching. These investigators consider a healthy national feeling to be a prerequisite for education for the world community. If education does not provide an outlet for the need of pupils to identify themselves with their country, it may lead to undesirable results, such as outbreaks of extreme

nationalism and susceptibility to infection by the remaining traces of the national-socialist thinking. The authors intend to devote particular attention to this aspect of the problem in their investigation.

The two authors are of the opinion that the survey will show that the respondent pupils give evidence of unequivocally democratic and internationally minded opinions and attitudes and would therefore appear to be consistently opposed to nationalism and anti-Semitism. It would thus seem that, notwithstanding what has been said to the contrary, the effort to conquer the past has succeeded. Whether the pupils' written replies to the standard questions will support such far-reaching conclusions can be verified only after the survey has been completed.

Fackiner and Raasch also anticipate, following a preliminary examination of their findings, that the historical knowledge of the respondent pupils will prove to be relatively limited. They presume, however, that there is no direct and positive connection between knowledge of modern history and politics, on one hand, and attitudes, on the other. On the question of relationship between national knowledge and national attitudes, they have so far come to the conclusion that the respondent pupils condemn their country on the basis of what they have learned and presumably know and see it in the role of the "villain" even when there are no historical grounds for doing so. They appear, nevertheless, to have clearly marked national attitudes. Should this conclusion be confirmed, the authors' suggested inference is that the type of knowledge provided by instruction in modern history and politics denies pupils an intellectual basis for the release of their national aspirations and prevents them from developing a positive identification with their country. In that case, political education in the Federal Republic of Germany would have to set itself a new task.

The Becker and Teschner Study

The status of political education in high schools was also the subject of an extensive study by Becker and Teschner (1962) of the Frankfurt Institute for Social Research—a study which provides a parallel to the Frankfurt student survey conducted by Habermas and others (1961). The purpose of the study by Becker and Teschner is to determine (a) how far the official syllabus and objectives laid down for political instruction affect the practical methods adopted and (b) to what extent attitudes and behavior of students are influenced. An analysis is therefore being made of the content of the ministerial orders and syllabi and of various recommendations and advisory memorandums concerning political education. An idea of the teaching methods used is obtained by observing lessons, by having exhaustive interviews with teachers, and by studying teaching material. In addition, the data obtained as a result of submitting questions in the classroom for written replies by pupils in the top grades will

shed light on the effectiveness of the political instruction imparted. The answers to the questions are designed to reveal the pupils' attitudes toward civics instruction; their political interests; the extent of their knowledge concerning the formal structure of democracy, economic questions, and current political events; their basic views on the democratic system; and their attitudes toward authority.

Preliminary Findings

On the basis of preliminary analysis of the responses of more than 300 students in 19 senior classes at 10 schools sampled, there is no indication that civics instruction—even if imparted by relatively good teachers—has any incisive influence on the political consciousness of pupils. Formal conformist agreement with the democratic system was expressed in all the classes surveyed, without exception. However, the proportion of convinced supporters of democracy (approximately three-tenths of the pupils questioned) seemed scarcely to have grown, as compared with the survey figures of Habermas and others (1961) for the Frankfurt students, most of whom attended high schools in Hesse, despite the extension and improvement of political education during the past few years. In the same way, the proportion of pupils who favor an authoritarian form of government has remained constant at about 20 percent.

Conclusion

Only after the completion of the two surveys by Fackiner and Raasch (1962) and Becker and Teschner (1962) and through a comparison of their results will it be possible to obtain a definite picture of the state of development of political education at the high schools covered by the investigation. However, it is already clear from the findings that systematic, empirical research to test how far educational aims have been achieved is both necessary and illuminating. A thorough and reliable investigation of the results achieved in applying new educational principles and in teaching new subjects is essential if difficulties and opposition are to be overcome. It would be wrong, of course, to overestimate the possibilities of even the best civics instruction and the even wider possibilities of school education in general for developing the pupils' political potential. The school is merely one of the factors at work in the process of adaptation to society. The home environment, informal peer groups, and mass media also bring their influence to bear in determining young people's political loyalties and their view of society. However, the importance of these factors serves to emphasize the greater need for the school to shoulder its share of responsibilities as an institution for providing an education in a democracy.

Bibliography

- BECKER, EGON, and TESCHNER, MANFRED. *Intention und Erfolg der Politischen Bildung an Hessischen Gymnasien* (Intention and Success of Political Instruction in Hessian High Schools). Frankfurt-am-Main: Institut für Sozialforschung, 1962.
- ELLWEIN, THOMAS. *Pflegt die Deutsche Schule Bürgerbewusstsein? Ein Bericht über die Staatsbürgerliche Erziehung in den Höheren Schulen der Bundesrepublik* (Do German Schools Cultivate Citizenship? A Report About Citizenship Education in the High Schools in West Germany). München: Isar Verlag, 1955. 309 p.
- FACKINER, KURT, and RAASCH, RUDOLF. *Ergebnisse Zeitgeschichtlicher und Politischer Bildung auf der Oberstufe Westdeutscher Gymnasien* (Results of Education in Current Events and Politics in the Upper Grades in West German High Schools). Frankfurt-am-Main: Hochschule für Internationale Pädagogische Forschung, 1962.
- HABERMAS, JUERGEN, and OTHERS. *Student und Politik. Eine Soziologische Untersuchung zum Politischen Bewusstsein Frankfurter Studenten* (Student and Politics. A Sociological Examination into the Political Consciousness of Students in Frankfurt). Neuwied: Hermann Luchterhand Verlag, 1961. 359 p.
- HILLIGEN, WOLFGANG. *Plan und Wirklichkeit im Sozialkundigen Unterricht: Untersuchungen, Erfahrungen und Vorschläge* (Plan and Reality in Instruction in Sociology: Research, Experiences and Suggestions). Frankfurt-am-Main: Bollwerk Verlags Gesellschaft, Jaehrig & Co., 1955. 241 p.

CHAPTER IX

Scandinavian Countries: Finland and Sweden

Finland-Martti Takala

TRADITIONALLY, educational research has been restricted in Finland to philosophical and historical studies; empirical research did not begin until the 1920's and 1930's. Since that time, the advantages of empirical approaches to educational problems have been increasingly recognized. Recently, A. Takala (1957) discussed the relationship between philosophical and empirical problems, and Pitkänen (1960) analyzed the relationship between theory and practice in educational research. As a result of efforts like this, the scientific approach to both kinds of research problems is more nearly correctly conceived, and their interrelations with education are better understood.

Main Research Emphases

In recent years, the major emphases in educational research in Finland have appeared to be on educational measurement, child development, sociology, social psychology of education, and methods of teaching.

Research in educational measurement, which has increased rapidly, has been closely connected with research in differential psychology and child development. Most studies have been designed for factor-analytical treatment of results, and new methodological advances in factor analysis have been adopted with very great interest. The transformation-analysis techniques developed by Ahmavaara (1954, 1957) have been especially popular because they allow for exact comparisons of factor structures in different populations of individuals, even with partly differing test batteries.

Three general groups of problems have been emphasized in child development. *First*, strong efforts have been made to use factor-analytical techniques for investigations of the development of mental and motor abilities. Several investigations have been concerned with differentiation of function with increasing age. *Second*, several studies on scholastic achievement at different grade levels have been conducted, and others are in the process of being completed. Similar methods of approach have been used for these problems. *Third*, a group of investigations in educational measurement have been guided by practical purposes as exemplified by research in the following areas: (a) the selection of pupils for secondary education, (b) the awarding of school marks, (c) matriculation examinations, (d) school maturity, and (e) child guidance.

The social psychology and sociology of education have been strongly emphasized in Finnish educational research. Human relations in the classroom have been studied in a great many investigations.

Interpersonal perceptions and attitudes of teachers, parents, and pupils have been described in different research projects. Attitude scales, standardized interviews, questionnaires, and other instruments for studies of parental and educational attitudes have been constructed.

In most studies an attempt has been made to clarify the relationships between attitudes and their social determinants. In some cases the influence of attitudes on behavior has been studied, and changes in attitudes have been studied longitudinally in others. Some of the research has been related to practical objectives—for example, educational guidance and selection of students in teacher seminaries. Other investigations have been conducted or begun about teachers' attitudes or their roles in modern society.

Attention paid to investigations of the didactics of individual school subjects or of the psychology of teaching and learning has been relatively slight, except for the theory of learning. Content analyses of the curricula in single subjects have been made mainly for the elementary level. There have been some attempts to apply these results to investigations of teaching methods.

Finally, the rather extensive research programs which have begun in personality development have been related to some degree to educational research, as in studies concerning the correlation between personality traits and school achievement and concerning the development of motivation in school learning.

Research Studies in Different Areas

Educational Measurement

The aim of Kiviluoto's (1956, 1959) work was to check the accuracy of predictions of success at the secondary-school level. On the basis of a longitudinal study, the minimum requirements for succeeding in secondary school were estimated; the relative importance of ability factors in school failure was ascertained; and relationships between age of admission to the primary or secondary schools and school achievement were reported.

Since school marks have not been determined by attainment tests, the problem of finding an adequate and consistent system of marking has been complicated. On the basis of empirical research, Vahervuo (1958) made suggestions concerning the reform of marking systems. In Vahervuo's study, an analysis of factors influencing teachers' marks was made. The marks given in different school subjects, in different types of schools, and by different teachers were compared. Moreover, the reliabilities of marks were estimated, and different kinds of marking errors were examined.

Child Development

In an extensive study of the dexterity of children aged 8-14, Heinonen (1957) investigated the development of ability structure with increasing age. The size of the sample made it possible to analyze relationships between social background and sex, on different ability factors. Although clear differences in the developmental curves of different abilities were reported, a comparison of the factor structures for successive age levels revealed only slight indications of differentiation of functions. In general, it has been shown in Finnish studies that the factor structure of the cognitive processes of young children must be considered to be much more differentiated than has been maintained for American children on the basis of Thurstone's tests of *Primary Mental Abilities*.

Some results on the development of personality and motivation were reported in investigations of athletic achievement. Heikkinen (1957b) carried out methodological studies for achievement research in class situations in normal school, and M. Takala (1961) examined personality differences between children achieving well and those achieving poorly in athletics. In the latter study, data were obtained from sociometric ratings, teachers' ratings, questionnaires, miniature life-situation tests, small-group play observation, projective techniques, and physiological measurements of affective arousal. It was found that the athletic achievement of both children and adolescents was most strongly correlated with such social characteristics as popularity and leadership. There also were positive correlations with aggressiveness, activity, and persistence.

The results reported by Oinonen (1960) on personality differences between children with good and poor handwriting belong to the same field of study. In a factor-analytical study of the characteristics of handwriting, the stability of handwriting was examined and found to be rather high. A moderate degree of relationship was revealed between productivity and poor handwriting.

Kallio (1961) attempted to show the influence of different types of pauses on working efficiency and speed in monotonous mental and manual tasks at different age levels. The relationship between type of task and satiation was shown, and variations in performance due to satiation were described and classified. He found that a short pause postponed the satiation threshold more if other tasks were presented during the pause than if no activity was interjected and that 12-year-old children were satiated later than younger or older subjects.

Methods of Teaching

The aim of Vahervuo's (1957) investigation was to clarify the effect of different teaching methods and teachers' attitudes on pupil achievement in arithmetic. He showed in this preliminary study some significant rela-

tionship between the procedures used by the teacher and measures of pupil achievement. An emphasis on a problem-solving approach in teaching as well as on frequent tests given to the class was found to be associated positively with level of attainment. Moreover, a matter-of-fact attitude was found to correlate positively, and a pedantic attitude was found to correlate negatively, with achievement. In addition, methodological problems were considered, and the difficulty of eliminating the influence of extraneous factors in this kind of study was discussed.

Problems of teaching reading and of reading difficulties were evaluated in a report by Hälinen (1957). Relatively few studies have been made, however, mainly because of the fact that reading does not present in the Finnish language problems similar to those occurring in less phonetic languages. As a result, the number of reading difficulties has been seemingly very low compared with other countries.

Social Psychology and Sociology of Education

In the study by Heikkinen (1957a) the following problems were attacked: (a) educational attitudes and practice-teaching success at the beginning of the practice-teaching period; (b) the influence of practice-teaching experiences on the general attitudes of student teachers; and (c) the prognostic value of teachers' attitudes. The methodological problems presented by validity studies of teachers' successes were examined in this study and in one by Koskenniemi and Lihtonen (1960).

In another study Koskenniemi (1960) reported results on teachers' attitudes toward punishment compared with the opinions of parents and pupils. In general, teachers' opinions did not correspond to those of parents and pupils.

Two studies of pupil behavior were reported in the literature. Koskenniemi (1957) carried out an interesting exploratory study of the influence of a change of teacher upon the social behavior of students within the school class. Social behavior was studied before the appearance of the substitute teacher, immediately after the introduction of the new teacher, and three months later. No clear-cut changes in social relationships among the pupils were found. In the second investigation, Lehmusvuori (1958) studied the influence of highly authoritarian and highly democratic teachers on pupil behavior in an aspiration-level experiment. He found very significant differences between children from authoritarian and democratic classes. With regard to their level of aspiration, children from democratic classes tended to be realistic after experiences of success and failure; whereas children from authoritarian classes not only changed their level of aspiration in a rigid way, but also reacted according to their last experience, irrespective of earlier achievement.

A. Takala (1958) carried out a questionnaire study of the role expectations of teachers-in-training. The roles expected of student teachers were

compared with the attitudes student teachers had about their roles. Situations involving evident conflicts were discussed.

An extensive coordinated investigation of parental child-rearing attitudes and practices in different environments was conducted by A. Takala (1960), A. Takala and Nummenmaa (1960), and M. Takala, Nummenmaa, and Kauranne (1960). Different techniques were developed for assessing the attitudes of parents, and the main methodological results showed that the variance of scores could not possibly be explained on the basis of authoritarian-democratic and acceptance-rejection attitude dimensions only. Secondly, it was found that different techniques did not usually correlate highly with each other, in spite of satisfactory reliabilities. There also was an empirical attempt to check earlier results concerning relationships between attitude scores and environmental factors, including locality, socioeconomic status, size of family, and sex. Discrepancies relative to earlier studies were discussed in terms of a theoretical framework.

Future of Educational Research

As has been noted earlier, the most significant and fruitful research that has been conducted during the past few years has been concerned with educational attitudes and teachers' roles and with the differentiation of abilities and attitudes. Since most of these studies have not been coordinated, it seems difficult to synthesize them in a way which could add anything to theory. However, some perspectives for future research may be outlined in these fields.

Educational Attitudes and Teachers' Roles

In addition to the problem areas which were investigated in the studies reported, the following problems should be cited as worthy of future study: (a) What motives lead to a choice of teaching as a profession? (b) What changes in students' social and educational attitudes occur during academic studies? (c) How do these changes correlate with the branch of study selection? (d) How are teachers' general social attitudes related to educational attitudes and practices and their adjustment in different surroundings?

It has been shown by several studies that the traditional dichotomization or unidimensional categorization of social attitudes (such as "authoritarian-democratic" or "integrative-dominative") is not sufficient for further analyses. Vague generalizations have usually been made on the basis of such dichotomies, and much confusion has arisen in the application of these generalizations in mental hygiene without careful analyses of value systems. Therefore, it seems to be of utmost importance in the future to differentiate problems in attitude research. Preliminary results in research seem to give some basis for the development of a broad theoretical frame-

work. However, it also has been shown that new methods must be developed for further studies of teachers' attitudes and behavior.

Differentiation of Abilities and Attitudes in Children

In the rather extensive studies which have been reported, very few indications of the differentiation of ability have been found. This lack of indication of differentiation may possibly be attributed to the limited variation of possible tasks which can be presented to the child. Therefore, it seems to be necessary to plan more detailed test batteries for children in future studies.

As another outcome, it seems likely that the diagnostic and predictive value of tests of educational achievement can be increased if the predictions can be made on the basis of patterns rather than single scores, in spite of the fact that batteries of differential tests have not always been so useful for predicting vocational success as had been expected. In research, the development of tests of factors of intelligence should be emphasized. This type of study will also present more knowledge of the nature of different components of intellectual functions.

Finally, it should be noted that the problems connected with differentiation and integration of attitudes and the development of concepts have yet to be understood clearly as problems of differential psychology. It seems that factor-analytical studies comparing cognitive and attitudinal structures of individuals or of successive age groups would be very useful, though their field of application has usually been somewhat limited. It seems probable that variations of factor techniques or some other techniques—for example, the semantic-differential technique by Osgood—might be fruitful for some problems. In any case, there are at the present several new methodological possibilities in research on complex cognitive and emotional functions in children that should be explored. In too many empirical studies the only generalization made possible by the experimental designs utilized has been the following one: There is gradual development in the function studied with increasing age.

Bibliography

- AHMAYAARA, YRJÖ. *Transformation Analysis of Factorial Data*. *Annales Academiae Scientiarum Fennicae*, Series B, No. 88 (2). Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1954. 150 p.
- AHMAYAARA, YRJÖ. *On the Unified Factor Theory of Mind*. *Annales Academiae Scientiarum Fennicae*, Series B, No. 106. Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1957. 176 p.
- HÄLLINEN, K. *Comparison Between Reading Comprehension and Reading Aloud*. Research Bulletin from the Institute of Education. Helsinki: the University, 1957. Unpaged.
- HEIKKINEN, V. *Comments on the Development of Teachers-in-Training*. *Annales Academiae Scientiarum Fennicae*, Series B, No. 112 (3). Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1957. 73 p. (a)

- HEIKKINEN, V. *A Study in the Learning Process in the School Class Environment*. Annales Academiae Scientiarum Fennicae, Series B, No. 111 (3). Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1957. 54 p. (b)
- HEINONEN, V. *Kätevyys ja sen kehittyminen kouluikä aikana* (Manual Skill and Its Development During the School Age). Acta Academia Paedagogica Jyväskylä, Vol. 13, 1957. 208 p.
- KALLIO, P. *Psyykkinen kyllästyminen kouluikäisillä* (Psychical Satiation in School Children in Different Pause Situations). Acta Academia Paedagogica Jyväskylä, Vol. 23, 1961. 220 p.
- KIVILUOTO, H. *Oppikoulumenestysproгноosisin kontrollista* (A Study of Prognostication of Success at Secondary School). Annales Universitatis Turkuensis, No. 59, Series B, 1956. 124 p.
- KIVILUOTO, H. *Oppikoulumenestysproгноosisin kontrollista II* (A Study of Prognostication of Success at Secondary School, II). Annales Universitatis Turkuensis, No. 73, Series B, 1959. 68 p.
- KOSKENNIEMI, M. *The Substitute Teacher as Indicator*. Annales Academiae Scientiarum Fennicae, Series B, No. 111 (2). Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1957. 57 p.
- KOSKENNIEMI, M. *The School Population and Punishments*. Annales Academiae Scientiarum Fennicae, Series B, No. 118 (2). Helsinki: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1960. 40 p.
- KOSKENNIEMI, M., and LIHTONEN, E. *One's Own Teacher and the Choice of Teaching Profession*. Research Bulletin from the Institute of Education. Helsinki: the University, 1960.
- LEHMUSVUORI, H. "The Effect of Teachers' Authoritarian and Democratic Attitude on the Children's Level of Aspiration After Success and Failure." *Acta Academia Paedagogica Jyväskylä* 16: 7-20; 1958.
- OINONEN, P. *Huono käsiala psykologisena ongelmana* (Poor Handwriting as a Psychological Problem). Acta Academia Paedagogica Jyväskylä, Vol. 21, 1960. 170 p.
- PITKÄNEN, PENNÄ. "Käytännön ja teorian vuorovaikutus kokeellisessa kasvatustieteessä" (Correlation of Practice and Theory in Empirical Pedagogics). *Kasvatus ja koulu* 46: 93-100; 1960.
- TAKALA, A. "Mentaalihygieniä ja kasvatus" (Mental Hygiene and Education). *Kasvatus ja koulu* 43: 127-37; 1957.
- TAKALA, A. "Opettajien kohdistuvista roolivaatimuksista" (The Role Expected of Teachers). *Kasvatus ja koulu* 44: 152-68; 1958.
- TAKALA, A. "Child Rearing Practices and Attitudes in Different Social Environments." *Annales Academiae Paedagogica Jyväskylä* 19: 77-152; No. 2, 1960.
- TAKALA, A., and NUMMENMAA, T. "Lastenhoitotapojen yhteydet kasvatustieteisiin ja erilaisiin sosiaalisen ympäristön tekijöihin" (The Relationship Between Child Care Practices, Parental Attitudes, and Different Factors of Social Environment). *Kasvatus ja koulu* 46: 49-66; 1960.
- TAKALA, M. "Suoriutumis- ja kilpailumotivaatiosta" (Achievement and Competition Motivation). *Kouluvoimistelu ja urheilu*, 1961. 13 p.
- TAKALA, M.; NUMMENMAA, T.; and KAURANNE, U. "Parental Attitudes and Child Rearing Practices: A Methodological Study." *Annales Academiae Paedagogica Jyväskylä*, 19: 1-75; No. 1, 1960.
- VAHERVUO, T. *Pupils' Arithmetical Ability: Differences due to the Teacher*. Annales Academiae Scientiarum Fennicae, Series B, No. 107. Helsinki, Finland: Suomalaisen Kirjallisuuden Seuran Kirjapainon Oy, 1957. 48 p.
- VAHERVUO, T. *The Awarding of School Marks*. Research Bulletin from the Institute of Education. Helsinki: the University, 1958.

Sweden—Torsten Husén and Nils-Eric Svensson

THE LAST TWO decades of Swedish educational history have constituted an industrious period of planning and reforms. A significant milestone was reached in 1950 with the decision of the Riksdag, the Swedish parliament, to introduce the comprehensive school. The story of how this reform was prepared and successively implemented is told by Husén and Henrysson (1959).

Specific measures for giving shape to the new school have been based on the recommendations of various state committees. In achieving these tasks, these committees have turned to psychologists and educators for answers to certain fundamental questions. One result of this increasingly common practice has been to intensify educational research as school reform moves ahead. In effect, educational researchers have been under a mandate to investigate thoroughly the basic problems encountered between 1950 and 1959, with the result that research since 1956 has dealt mainly with four problem areas: differentiation (or grouping), content of curriculum and methods of instruction, achievement testing and marking practices, and teacher selection and training.

Differentiation of Pupils

The psychological foundations of differentiation constituted the basis for an exhaustive study by Härnqvist (1960) who attempted to determine whether intellectual abilities and occupational interests tend to become subdivided and differentiated with increasing age or tend toward a general leveling and integration. His subjects consisted of 1645 boys and 1553 girls in grades 4-9, who were given the same achievement and interest tests. All test scores were intercorrelated for boys and girls separately as well as for each grade group, and the extent of intra-individual as compared with inter-individual differences was computed. The results with respect to achievement provided no clear-cut support for the differentiation theory, although the development of interests seemed to fit well within it.

For students in grade 7, Johannisson and Magnusson (1960) considered the effects of various types of differentiation on the personal and social adjustment of pupils, by obtaining sociometric data, self-ratings, and measures of attitudes toward the teacher, classmates, and various aspects of the school. Unfortunately, since the interaction of pupils and their attitudes in different milieus presented no easily interpretable pattern, the findings favored no one system of differentiation. In this same type of study, Svensson (1959) dealt with the controversy which has arisen regarding the possibilities of descriptive survey and experimental design. Basic difficulties of an administrative and practical nature that occur when a "pedagogical climate" is subjected to controlled experimentations were considered.

Blomqvist (1958) studied success and failure in the selective secondary school by comparing promoted and nonpromoted students, matched on intelligence, with respect to a series of social-background variables and ratings by parents and teachers. The largest differences between the two groups occurred relative to certain sociocultural factors.

In investigating the attrition rate of the selective secondary school, Orring (1959) followed up the school career of a 20-percent sample of an age group admitted; he employed as a criterion the number of years needed to graduate. One-half of the group reached graduation without delay—that is, without grade repeating. Although the temporal period was correlated with school marks obtained in the elementary school, the number of nonpromotions was so frequent even in the top quarter of the group that school marks could not readily be used as the sole selective device.

Content of Curriculum and Methods of Instruction

Before 1950, almost no research had been devoted to didactic problems. Magne (1960) has made a pioneering contribution to the study of methods of teaching elementary-school arithmetic. In an extensive survey, he assessed the extent to which specific "arithmetic difficulties" were present in the work of students of the elementary school and proceeded to develop methods of diagnosing specific difficulties.

As part of a curriculum-construction program for the nine-year comprehensive school, an extensive research project in mathematics, Swedish, physics, chemistry, and civics was sponsored jointly by the 1957 School Committee and the Industrial Council for Social and Economic Studies. Results of the project were reported by Dahllöf (1960) and by Dahllöf and Husén (1960). In general, the findings provided evidence concerning such factors as the time allotted to different topics, student achievement in different topics, and methods of teaching used by teachers in different types of schools.

Werdelin (1958) investigated the structure of abilities needed for solving mathematical problems. In his study of 217 boys, he factor-analyzed 35 ability and achievement tests and obtained six factors, of which five were interpreted as factors of numerical facility, verbal ability, visualization, deductive reasoning, and general mathematical reasoning. A fairly large, second-order general factor was found among those intercorrelated factors. Subsequently, Werdelin (1960) studied the nature of geometrical ability and of spatial abilities in boys and girls.

Björnssen (1960) investigated the marking of compositions, which are especially important in the written school-leaving examinations in Sweden. If the average of a large number of judges is regarded as the "true score" of a composition, he concluded that the average rating of a random sample of five judges will come fairly close to this score.

Reading

In a noteworthy publication, Edfeldt (1959) contributed to the development and application of a new methodology to the problem of silent speech in reading. The movements in the larynx were recorded by means of electromyographic registration. Silent speech as measured by this new technique turned out to be a consequence, rather than a cause, of reading difficulties. In a comprehensive investigation, Malmquist (1958) studied reading difficulties at the end of grade 1 in the elementary school (the children being at the average age of eight). The main purposes were the following: (a) to arrive at an operational definition of reading difficulties and in that connection to construct the necessary instruments for identifying children with such difficulties; (b) to clarify the relationship between reading handicaps and a series of psychological, pedagogical, somatic, and socioeconomic variables; (c) to see for how long difficulties manifested during the first school year persist; and (d) to analyze the reading and spelling errors made at various levels of reading proficiency.

Edlund (1957) analyzed the reading vocabulary of school children at various grade levels by means of a multiple-choice test, consisting of 759 words that constituted a stratified sample of the complete dictionary of the Swedish Academy. The development of this reading vocabulary was studied for a complete school population in one of the larger towns in Sweden.

Achievement Testing and School Marks

The construction and development of tests has been of concern to Henrysson, who has devoted the bulk of his research to factor analysis and reliability problems. In a monograph on factor analysis, Henrysson (1957) discussed, among other things, the use of factor analysis in test construction.

As part of a project on constructing achievement tests in English, which are given to all students in grade 6, Larsson (1959) studied various methods of assessing pronunciation by group-administered tests and arrived at a method that was satisfactory from a practical point of view.

Since 1949, admission to the secondary academic school (*realskola*) has been based upon school marks obtained at the previous level of school. This requirement has served to make both the public and professional educators more sensitive than previously to the validity and usefulness of school marks. In this context, Flodby (1957) studied how marking practices have developed since the beginning of the 1940's under the influence of centrally issued prescriptions and achievement tests.

Several research workers investigated the problem of school motivation and its relation to school performance. In particular, Ljung (1960) examined the relation between anxiety and school performance. The main purposes of his study were these: (a) to construct unidimensional, moti-

vational scales measuring general school motivation and test anxiety by factor-analyzing a self-report questionnaire; (b) to relate those motivational variables to cognitive variables (achievement-test results and school marks); (c) to compare children in grade 4 and in grade 6, as well as the two sexes, with respect to the motivational variables; and (d) to study the effects of a concentrated 14-day testing period on the motivational variables.

General school motivation correlated positively with the cognitive variables for boys in grade 4 and for girls in grade 6 (the magnitudes of r falling between .26 and .31), but not for girls in grade 4 or for boys in grade 6. There was a substantial difference between boys and girls and between the two grades in that (a) the girls were more highly motivated than the boys and (b) the pupils in grade 4 were more highly motivated than those in grade 6.

Test anxiety correlated significantly with the cognitive variables for all groups as indicated by a mean product-moment correlation of .35.

The concentrated testing period appeared to exert a positive effect on boys in grade 4. Boys in grade 6 at the lowest level of achievement were less school-motivated and less anxious after the testing period. There was a clear overall tendency of less test anxiety after the testing period.

Teacher Selection and Training

Research on teacher selection was inspired by the need of increasing enrollment in the teacher-training colleges after the war. The 1946 School Commission proposed that certain aptitude tests should be used on a trial basis. However, since the colleges were given almost complete freedom in selecting and administering tests, the groups of subjects were too small to carry through fruitful validation studies. Recently a research program sponsored jointly by the four Scandinavian countries has been started. The Swedish part of the program deals mainly with methods of establishing field criteria of teaching efficiency.

Bibliography

- BJÖRNSSON, C. H. *Uppsatsbedömning och uppsatsskrivning* (Writing and Grading Compositions). Stockholm: Almqvist and Wiksell, 1960.
- BLÖMQVIST, JOHN. *Kvarsittning och skolframgång* (Grade Repeating and School Success). Stockholm: Almqvist and Wiksell, 1958. 122 p.
- DAHLLÖF, U. *Kursplaneundersökningar i matematik och modersmålet: Empiriska studier över kursinnehållet i den grundläggande skolan* (Curriculum Research in Mathematics and the Mother Tongue: Empirical Investigations of Curriculum Content in the Basic School). Stockholm: Statens Offentliga Utredningar, 1960. 536 p.
- DAHLLÖF, U., and HUSÉN, TORSTEN. *Matematik och modersmålet i skola och yrkesliv* (Mathematics and the Mother Tongue in School and Society). Stockholm: Studieförbundet Näringsliv och Samhälle, 1960.
- EDFELDT, ÅKE W. *Silent Speech and Silent Reading*. Stockholm: Almqvist and Wiksell, 1959. 164 p.

- EDLUND, SVEN. *Studier rörande ordförrådsutvecklingen hos barn i skolåldern* (Studies in the Development of Vocabulary in School Children). Lund: C.W.K. Gleerup, 1957. 260 p.
- FLODBY, O. *Betygsgivningen i folkskolan* (Marks Given in the Elementary School). Stockholm: Almqvist and Wiksell, 1957. 100 p.
- HÄRNQVIST, K. *Individuella differenser och skoldifferentiering* (Individual Differences and School Differentiation). Stockholm: Statens Offentliga Utredningar, 1960. 127 p.
- HENRYSSON, STEN. *Applicability of Factor Analysis in the Behavioral Sciences*. Stockholm: Almqvist and Wiksell, 1957. 156 p.
- HUSÉN, TORSTEN, and HENRYSSON, STEN, editors. *Differentiation and Guidance in the Comprehensive School*. Stockholm: Almqvist and Wiksell, 1959. 196 p.
- JOHANNISSON, I., and MAGNUSSON, D. *Social-och personlighetspsykologiska faktorer i relation till skolans differentiering* (Social and Psychological Factors Related to School Differentiation). Stockholm: Statens Offentliga Utredningar, 1960. 171 p.
- LARSSON, P. O. *Ett försök att objektivt bedöma engelskt uttal i folkskolans sjätte klass* (An Attempt To Measure Objectively English Pronunciation in the Sixth Grade of the Elementary School). Uppsala: Institute of Education, University of Uppsala, 1959.
- LJUNG, B. O. *Motivation, Anxiety, and School Performances*. Research Bulletin from the Institute of Educational Research, No. 3. Stockholm: the Institute, Teachers College, University of Stockholm, 1960.
- MAGNE, OLAF. *Räknesvårigheter i folkskolan* (Calculation Disabilities in the Elementary School). Stockholm: Svensk Lärartidnings förlag, 1960.
- MALMQUIST, E. *Factors Related to Reading Disabilities in the First Grade of the Elementary School*. Stockholm: Almqvist and Wiksell, 1958.
- ORRING, J. *Flyttning, kvartsättning och utkuggning i högre skolor i relation till skolans betygsättning* (Promotion, Grade-Repeating, and Drop-Out in Secondary School in Relation to Marks Obtained in the Elementary School). Stockholm: Statens Offentliga Utredningar, 1959. 88 p.
- SVENSSON, N. E. *Prestationsutveckling i olika differentieringsmiljöer* (Development of School Performances in Different Pedagogical Milieus). Stockholm: Institute of Educational Research, Teachers College, University of Stockholm, 1959.
- WERDELIN, I. *Mathematical Ability: Experimental and Factorial Studies*. Doctor's thesis. Lund, 1958.
- WERDELIN, I. *Geometrical Ability and Space Factors in Boys and Girls*. Lund: C.W.K. Gleerup, 1960.

CHAPTER X

Yugoslavia

VLADIMIR MUŽIĆ

ALTHOUGH YUGOSLAVIA has had a long and fruitful tradition of philosophical and historical inquiries into educational problems, the development of a scientific approach to educational problems is of comparatively recent date. The general trend toward a scientific approach to educational problems in Europe and North America at the beginning of this century had only a very limited influence in Yugoslavia. Accordingly, there are only a few academicians in Yugoslavia who are associated with the scientific movement in education. One such person is P. Radosavljević, collaborator of E. Meuman and author of a two-volume work, *An Introduction to Experimental Pedagogy* (1912). Radosavljević, however, lived for some time outside of Yugoslavia, serving as a faculty member of New York University from 1911 to 1945, and hence his influence was limited. Others actively involved in the scientific movement in education are J. Iskruljev and F. Higy-Mandić. It is probably in the area of testing and assessment that Yugoslav educators have made some of their most important contributions to the scientific movement in education, with many of those contributions being made in the 1930's.

The general principles guiding the recent Yugoslav school reform, along with their administrative implementation, were derived from social and philosophical considerations rather than educational research. From this reform, however, has arisen a need for exact methods of research to assist in the development of a scientific basis for practical solutions to specific problems. Especially important and needed, for example, is research evaluating teaching methods and particular kinds of educational organization.

The general organization of scientific work in Yugoslavia is based on several federal laws of recent date (Zakon O Organizaciji Naučnog Rada, 1957; Zakon O Načinu Financiranja Naučnih Ustanova, 1960; Zakon O Saveznom Fondu Za Naučni Rad, 1960). These documents present the general formulations, which are then spelled out in more detail in the laws of the respective republics. Legal documents on the foundation and organization of various educational bodies also deal with research activities (Opći Zakon O Skolstvu, 1958; Opći Zakon O Fakultetima I Univerzitetima, 1960; Zakon O Visokoškolskom Obrazovanju, 1961; Zakon O Pedagoškim Akademijama, 1960).

The organization of research institutions reflects the federal structure of the country, which is composed of six separate republics. Research within the federal framework is carried out by the Federal Institute for

the Study of Educational Problems. The activities of the Institute are directed mainly toward problems of educational administration, but these are being progressively widened to include such areas as methods of teaching and educational measurement. At the present time, however, these fields are receiving more attention in the research institutions of particular republics: for example, the Institute for Educational Research in Serbia and the Education Research Branch of the Institute for Advancement of Teaching in Croatia. No journal is being published that is specifically devoted to educational research. Research reports are published in various educational journals and in bulletins and miscellaneous reports issued by educational institutions.

Financial Resources

Until very recently individuals and agencies undertaking educational research were financing their work through regular institutional budgetary procedures. Recent federal policies and laws, however, have emphasized opportunities for financing such work through contracts between research agencies and interested government agencies with available funds. These fund-granting agencies are either interested in the general development of scientific work in education (e.g., the Council for Scientific Work) or the practical use of the results of educational research (e.g., federal, state, and local educational authorities). It must be emphasized that this method of financing educational research is a very new development, but initial results give justified reasons for optimism.

Administration

Earlier surveys related to school reform have now been replaced by surveys concerning specific problems in the internal operations of schools. These surveys concentrate on the actual school situation as a starting point for the further development of the school in accordance with the needs of the social system of the country.

The Community of Yugoslav Cities (Stalna Konferencija Gradova Jugoslavije, 1957) surveyed social management in schools as a specific form of Yugoslav school administration. Radosavljević and Juhas (1959) surveyed and considered the future development of various kinds of extra-curricular activities in the elementary school, the vocational school, and the gymnasium. Juhas and others (1960) studied the problems and needs of boarding schools from the points of view of curriculum, organization, and finances.

With respect to curricula and courses of study it must be pointed out that they are determined by official state regulations. Problems of implementation are then studied by both transversal and longitudinal approaches. Krneta and others (1960) compared the actual elementary-

school curricula and courses of study in particular Yugoslav republics. Pivac (1961) reviewed the course of study regulations in Croatia between 1948 and 1960. Analyzing the seven consecutive courses of study, he found a trend toward devoting a greater amount of time to the teaching of natural sciences, mathematics, and the so-called formal subjects (e.g., music, fine arts, technical education, home economics, and physical education).

Curriculum and Teaching Methods

Several surveys have been made of the level of knowledge and skills attained by pupils in the various republics. Either these surveys covered many different school subjects, as did Troj with a team from the Institute for Educational Research in Serbia (Troj and others, 1960), or they concentrated on one particular skill and used a more analytical approach. Examples of the latter are the work of the joint teams of the Institute for the Advancement of Teaching and the Institute of Education of the University of Zagreb, which conducted surveys of basic arithmetic skills (Aranjoš and others, 1960), mental arithmetic (Aranjoš and others, 1961), and spelling (Šimleša and others, 1959). The Šimleša team also measured the influence of summer vacations on spelling competency (Šimleša and others, 1960). In general, there was no evidence of significant forgetting during the vacation period, but the data did seem to indicate that the boys as a group showed very small losses, while the girls demonstrated small gains.

Research involving the experimental comparison of the efficacy of various teaching methods has been rather limited both in terms of the problems included and techniques employed. Methods of analysis are generally limited to the classical parallel groups or single-group methods. Analyses of variance or covariance are not being used. Aranjoš and others (1959) studied a method of teaching spelling that involved dictation with a simultaneous effort to prevent mistakes; substantial gains were reported for this method. Markovac (1958) examined the efficacy of individualized supplementary-reading tasks. Kvašček (1959a, b, c, 1960a) conducted some experiments on methods and procedures of improving essay-writing. Kvašček (1960b) also studied the aesthetic aspect of language arts, reporting the findings of an experiment on the influence of motivation and prior experiences on the teaching of aesthetic values and judgment in literature courses. In this same study, the author also identified many of the prejudices that influenced the judgments made about the value of literature texts.

In the field of arithmetic, Mužič (1959a) examined the effect of short, systematic mental arithmetic exercises on the development of this skill and on other goals of mathematics teaching. Ničković (1958a) conducted a diagnostic study of pupils' mistakes and difficulties in elementary algebra.

Zvonarević and Brozović (1958) compared students who had and who had not had extensive training in aesthetics, with respect to their reactions to abstract and realistic pictures. Reactions were measured by means of a rating scale and an electrodermal measurement apparatus. They found (a) that both groups had the stronger affective reactions to the abstract pictures; (b) that the subjects with the training in aesthetics had stronger affective reactions toward both kinds of pictures; (c) that those with aesthetics training preferred the abstract pictures, while those without it preferred the realistic ones; and (d) that there was no correlation between the intensity of the affective reaction as measured by the electrodermal apparatus and pleasure as measured by the rating scale.

Other studies of interest are those of Vrečić (1961), who analyzed the content of the free drawings of children from both urban and rural areas; Gollner and Mužić (1959), who examined the educational value of pupils' visits to museums; and Melvinger and Bakovljević (1960), who evaluated the educational growth of pupils subjected to a bilingual teaching situation.

Educational Measurement

A complete survey of the field of measurement is outside the scope of this chapter, since these tests are generally not published, but are restricted to official agencies and institutions. The situation is similar in the field of personality testing, where the chief work is done in institutions for counseling and guidance. In the area of intelligence and aptitude testing, some foreign-made mental-growth scales have been revised for use with Yugoslav children, and some new tests have been constructed. Some test batteries have been subjected to factor analyses. Toličić (1957) adapted the Schenk-Danzinger Viennese aptitude-test battery and correlated the tests with pupils' success in various school subjects.

Recent school reform promoted much of the research activity in this area, for it was early recognized that the traditional methods of evaluating pupil progress were not satisfactory. An adequate evaluation of the success of the reform seemed to be contingent upon a more adequate evaluation of pupil success.

Some research in evaluation procedures was carried out before World War II. A group of studies conducted as a part of a Carnegie Foundation project demonstrated the low reliability of traditional subjective grading procedures, but led to few practical consequences in terms of school organization or educational theory (Bujas, 1941; Bujas and others, 1941). After the war, all efforts were directed toward rebuilding a war-damaged country and educational system and orienting educational aims toward the new social organization. All work during this period was limited to personal judgments about how to improve the traditional subjective grading procedures (e.g., Škalko, 1951).

It was around 1955 that the trend of school reform brought about a strong dissatisfaction with the existing system of evaluation. Nola's (1955) study is a case in point. Shortly afterwards Rot and Vasić (1956) emphasized the use of achievement tests in improving evaluation; and Troj (1957), Krković (1960), and Mužić (1961) wrote about the principles of test construction, the development of teacher-made objective tests, and the use of other procedures for pupil evaluation. Potkonjak (1958) emphasized the limitations of such techniques and the dangers of an erroneous interpretation of obtained results. He also pointed out that some traits of personality, although their development was an important objective of the school-reform program, were very difficult to assess reliably by means of objective tests. The existence of this kind of controversy helped teachers and other interested persons to achieve a sense of balance and perspective about evaluation problems, but much of it could not be regarded as research *per se*.

At about the same time, however, there developed an interest in the construction of achievement tests and research related thereto. In Serbia, standardized tests were constructed covering entire subject-matter areas (Troj and others, 1960); and, in Croatia, two diagnostic mathematics tests were developed which covered a relatively small segment of elementary mathematics (Odjel Za Pedagoška . . . , 1960). Recently the Federal Institute for the Study of Educational Problems entered the field with plans to construct and validate achievement tests on nationwide samples.

Research in this area is also conducted by local educational authorities, elementary and secondary schools, teacher-training institutions, universities, and individuals, with much of it oriented toward finding more effective methods of objective pupil evaluation. Indin and others (1960) tried to develop evaluation procedures for a combined work-study technical-education program. Lekić (1961) compared teachers' grades with achievement-test results in elementary science. Peašinić (1958), Prvanović (1959), and Rodik (1960a, b) conducted similar studies and gave examples of teacher-made objective tests in mathematics. Sapunar (1957) did much the same thing for the vocational-school subjects, while Bošnjak (1960) did it for language. Mužić (1960) took Roller's French spelling test (Ortho 25), originally developed for elementary-school children who used French as the vernacular, and standardized it and examined its diagnostic value for use in Croatian secondary schools, where French is taught as a foreign language. Car-Gavrilović (1958), analyzing data gathered in an experimental gymnasium, found that the best predictors of future school success were, in order, achievement tests, intelligence tests, and earlier elementary-school final grades. Currently the Institute of Education of the University of Zagreb is developing the Yugoslav version of the UNESCO tests to be used as a part of the international study of intellectual attainment.

In the field of achievement-test theory, Sorokin (1960) took the individual grades and average grades of two, three, and four teachers who

had examined students in independent oral examinations and essay examinations and correlated these with achievement-test results. He found that the correlation between achievement-test results and teachers' marks increased with the number of teachers whose grades were included in the average.

A recent official regulation introduced two methods of evaluating pupil performance: (a) a descriptive grading system with a primarily diagnostic function and (b) a numerical grading system which gives an overall picture of pupil performance in terms of a five-point rating scale. This regulation has created new research problems, and it seems probable that much of the future research in educational measurement will be devoted to the more easily studied, descriptive grading system.

Educational Psychology

In the field of educational psychology, Furlan (1960b, 1961) conducted two studies on word frequency and children's vocabulary. In the latter he made an attempt to develop a model of the structure of speech. Balint (1957) analyzed the Serbo-Croatian vocabulary of Hungarian minority-group pupils who were learning Serbo-Croatian as a second language. Mandić (1960) and Agović (1960) studied the causes of lying among students in school and at home, using the techniques of questionnaire, interview, systematic observation, and case analysis.

Educational Sociology

In the field of educational sociology, Juhas (1959) analyzed the social environment and status of apprentice-school pupils, the structure of their day, their activities in various social fields, and their interest in and knowledge of the economic and political structure of the country. Janković (1960) considered the leisure-time problems of youth attending various schools in a littoral town in Croatia. Vukanović (1958) analyzed the influence of family conditions on the scholastic achievement and social behavior of pupils. Lazić (1959) analyzed the relationship between a pupil's scholastic achievement and his sociometric position in class. Ničković (1958b) and Car-Gavrilović (1956) also conducted some sociometric studies, but primarily for illustrative purposes.

The Youth Voluntary Labor Projects were the subject of some research which sought means of increasing their educational value, primarily by improving interpersonal relationships. Supek (1958a, b, 1959) queried the members of a project about such matters as the significance of the project, their likes and dislikes, their perception of interpersonal and intergroup relations, and their opinions on existing problems of work organization and discipline. Their attitudes and opinions were sought shortly after the beginning and at the end of the project, and the investi-

gator was thus able to discern the influence of the project on the participants and make suggestions about future improvement. Kilibarda's (1959) study, although it also involved members of such a project, was primarily concerned with the attitudes of young workers and peasants toward the intelligentsia.

Mental and Physical Development

Not enough research has been carried out in the area of mental and physical development for particular trends to be noted, except insofar as the research in testing, which was previously described, has brought to light incidental information of relevance here. Studies more specifically related to this area are those of Dorđević (1960) and Furlan (1960a), who examined the level of knowledge of preschool children, and of Toličič (1961), who analyzed the intellectual growth of children as revealed in their play activity.

Research Methods

Because the recognition of the need for exact methods in educational research was of such recent origin, the published works in this field do not go beyond the level of handbooks (Radojković, 1959; Schmidt, 1960; Troj, 1958) and theoretical considerations of the need for such an approach (Stevanović, 1958; Šmit, 1958).

Teacher Personnel

Franković and others (1960) and Kečenović (1958) made surveys of teaching personnel, which pointed out needs resulting from school reform and gave evidence of an increasing trend for elementary teachers to go beyond normal-school training and complete the course of work for the two-year Pedagogical Academy after secondary-school training. A survey of elementary-school teachers in Slovenia investigated their motives for choosing the teaching profession, their sources of satisfaction in the profession, and the extent of their training (Filozofsko in Sociološko Društvo . . . , 1961). In the area of pupil evaluation of teachers, Lazić (1956) analyzed the attitudes of pupils toward different teacher characteristics, and Mužić (1959) used pupil ratings in an attempt to measure the success of a teacher's approach to instruction.

Other Fields of Education

In the field of vocational teaching, Salamon and Starčević (1957) analyzed the relationship between speed and precision in the work of the

pupils of the Metal Industrial School. Finding that additional training seemed to be associated with increased speed at the expense of precision, the authors concluded that the workshop program must emphasize precision initially and later encourage students to increase production without sacrificing quality.

In adult education Ničković and others (1960) analyzed the results of an inquiry on attitudes of adults toward the methods and content characteristic of general-education programs. They also considered various personal and vocational problems of students in general adult-education courses. Žalac (1959) conducted a similar analysis in an institution for adults who had not completed their elementary education. Zvonarević (1960) questioned the students of vocational courses about the nature, content, length, practical utility, and other aspects of their courses. In another study, Zvonarević (1955) sought some of the psychological and social factors underlying juvenile delinquency.

Conclusion

Although subjective judgment still plays a large part in decisions about most practical educational problems in Yugoslavia, research is assuming an increasingly important role. However, there are three major problems that remain to be solved: (a) the coordination of the plans and activities of the different research agencies, so as to avoid a fragmentary approach and effect a balanced and comprehensive research program; (b) the provision of adequate research facilities and equipment; and (c) the provision of an adequate number of specialists in educational research. The fact that there are so few skilled researchers in relation to the great number of pressing educational problems that require research results in a dispersion of effort by the individual researcher and a consequent lack of specialization in depth. Despite the magnitude of these problems, however, the increasing interest in educational research evidenced by teachers and the official agencies gives reason for optimism concerning their ultimate solution.

Bibliography

- AGOVIĆ, T. "Pojave neiskrenosti i laži kod omladine uslovljene odnosima u porodici". (The Influence of Family Conditions on the Insincerity and Lies of Young People). *Naša škola* (Sarajevo) 11: 462-66; No. 9-10, 1960.
- ARANJOŠ, E., and OTHERS. "Diktat kao sredstvo za unapredjenje pravopisne pismenosti" (Dictation as a Means of Improving Orthography). *Bilten Zavoda za unapredjivanje školstva NRH* (Zagreb) 4: 1-24; No. 1, 1959.
- ARANJOŠ, E., and OTHERS. "Nivo vladavanja osnovnih računskih operacija kod učenika V do VIII razreda osnovne škole" (The Level of Basic Arithmetic Skills, in the Fifth to Eighth Grade of Elementary School). *Bilten Zavoda za unapredjivanje školstva NRH* (Zagreb) 5: 91-99; No. 4-5, 1960.

- ARANJOŠ, E., and OTHERS. "Nivo vještine računanja napamet kod učenika V do VIII razreda osnovne škole" (The Level of Mental Arithmetic in the Fifth to Eighth Grade of Elementary School). *Pogledi i iskustva u reformi školstva* (Zagreb) 6: 121-25; No. 1-2, 1961.
- BALINT, Š. "Rečnik učestalosti srpskohrvatskog jezika kod učenika mađarske nacionalnosti u osmim razredima osmogodišnjih škola u Subotici" (Serbo-Croatian Word Frequencies of Pupils of Hungarian Nationality in the Eighth Grade of Elementary School in Subotica). *Pedagoška stvarnost* (Novi Sad) 3: 705-11; No. 9, 1957.
- BOŠNJAK, T. "Na što ukazuju rezultati testiranja učenika osnovnih škola iz nastave materinjeg jezika" (Results of Serbo-Croatian Language Tests in Elementary Schools). *Život i škola* (Osijek) 9: 390-94; No. 9-10, 1960.
- BUJAS, R., and OTHERS. "Subjektivni faktor u školskom ocjenjivanju" (The Subjective Moment in Pupils' Marks). *Napredak* (Zagreb) 82: 97-125; No. 3, 1941.
- BUJAS, Z. "Tačnost i osjetljivost nastavnika pri ocjenjivanju školskih zadata" (Precision and Sensitiveness of Teachers at Marking Pupils' School Essays). *Napredak* (Zagreb) 82: 152-65; No. 4-5-6, 1941.
- CAR-GAVRILOVIĆ, I. "Metode upoznavanja učenika i razrednog kolektiva" (Methods of Improving Knowledge About Pupils and Their Collective). *Bilten zavoda za unapređenje nastave i općeg obrazovanja NRH* (Zagreb) 1: 7-13; No. 7, 1956.
- CAR-GAVRILOVIĆ, I. "Istraživački rad škole" (Research in the School). *Bilten Zavoda za unapređenje nastave i općeg obrazovanja NRH* (Zagreb) 3: 4-12; No. 3-4, 1958.
- DORDEVIĆ, B. "Predznanje učenika prvog razreda i njihov uspjeh u školi" (Preknowledge of First Grade Elementary School Pupils and Their School Success). *Savremena škola* (Beograd) 15:183-88; No. 3-4, 1960.
- FILZOFSKO IN SOCIOLOŠKO DRUŠTVO L. R. SLOVENIJE. *Anketa o delu in položaju učiteljev* (Inquiry About the Work and the Status of Teachers). Ljubljana: Filozofsko in sociološko društvo L. R. Slovenije, 1961. 190 p. (Mimeo.)
- FRANKOVIĆ, D., and OTHERS. *Obrazovanje nastavnika osnovne škole* (The Training of Elementary School Teachers). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1960. 65 p. (Mimeo.)
- FURLAN, I. "Matematički pojmovi djece na početku školovanja" (Mathematical Concepts of Children at the Beginning of Their Schooling). *Pedagoški rad* (Zagreb) 15: 191-203; No. 5-6, 1960. (a)
- FURLAN, I. "Tisuću najčešćih riječi i čitanje" (The Thousand Words with the Highest Frequency and Reading Skill). *Bilten Zavoda za unapređivanje školstva NRH* (Zagreb) 4: 6-23; No. 1, 1960. (b)
- FURLAN, I. *Raznolikost rječnika i struktura govora* (Diversity of Vocabulary and Speech Structure). Doctoral thesis, Zagreb, 1961. 124 p.
- GOLNER, N., and MUŽIĆ, V. "Eksperimentalna verifikacija obrazovnog efekta učenika posjeta muzeju" (An Experimental Verification of the Educational Value of Pupils' Visits to Museums). *Pedagoški rad* (Zagreb) 14: 125-30; No. 3-4, 1959.
- INDIN, M., and OTHERS. *Proizvodna praksa učenika osnovne škole u preduzećima kao vid povezivanja nastave s proizvodnim radom* (Elementary School Pupils' Practice in Production Enterprises as an Aspect of Associating Teaching with Productive Work). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1960. 109 p. (Mimeo.)
- JANKOVIĆ, V. "Anketa o slobodnim aktivnostima školske omladine u Zadru" (A Survey of Leisure-Time Activities of Secondary-School Pupils in Zadar). *Bilten Zavoda za unapređivanje školstva NRH* (Zagreb) 4: 43-68; No. 1, 1960.
- JUHAS, M. *Neka pitanja života i rada učenika u privredi* (Some Problems of Life and Work of Apprentice School Pupils). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1959. 40 p. (Mimeo.)
- JUHAS, M., and OTHERS. *Domovi učenika—internati* (Boarding Establishments for Pupils). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1960. 58 p. (Mimeo.)
- KEČENOVIĆ, E. "Nastavni kadar u narodnim školama NRH" (Teaching Personnel in Elementary Schools in P.R. of Croatia). *Pedagoški rad* (Zagreb) 13: 17-26; No. 1-2, 1958.
- KILIBARDA, K. "Humanizacija odnosa između radničko-seljačkog sloja i inteligencije" (Humanization of Attitudes Between Workers and Peasants on One Side and the Intelligentsia on the Other Side). *Pedagoška stvarnost* (Novi Sad) 5: 601-608; No. 8, 1959.

- KRKOVIĆ, A. *Merenje u psihologiji i pedagogiji* (Measurement in Psychology and Education). Beograd: Zavod za izdavanje udžbenika NRS, 1960. 68 p.
- KRNETA, L. J., and OTHERS. *Uporedna analiza nastavnih planova i programa za osnovne škole u pojedinim narodnim republikama* (Comparative Analysis of Courses of Study and Curricula in Particular People's Republics). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1960. 168 p. (Mimeo.)
- KVAŠČEV, R. "Eksperimentalno ispitivanje aktiviranja i stvaranja reči od strane učenika" (An Experimental Examination of the Creation and Activation of Pupils' Vocabulary). *Pedagoška stvarnost* (Novi Sad) 5: 568-77; No. 7, 1959. (a)
- KVAŠČEV, R. "Eksperimentalno psihološko i pedagoško ispitivanje pismenih radova učenika" (An Experimental Psychological and Educational Research of Pupils' Essays). *Naša škola* (Sarajevo) 9: 387-403; 1958. 10: 40-46, 122-30, 243-51; 1958. 1-2, 3-4, 5-6, 1959. (b)
- KVAŠČEV, R. "Psihološke i pedagoške osnove bogaćenja rečnika učenika" (The Psychological and Educational Bases of the Growth of Pupil's Vocabulary). *Pedagoška stvarnost* (Novi Sad) 5: 505-12; No. 6, 1959. (c)
- KVAŠČEV, R. "Eksperimentalno proveravanje vrednosti metoda pismenosti" (An Experimental Evaluation of Procedures for Improving Written Expression). *Pedagoška stvarnost* (Novi Sad) 6: 341-52; No. 5, 1960. (a)
- KVAŠČEV, R. "Uloga subjektivnih faktora u razvijanju estetske percepcije" (The Role of Subjective Factors in Developing Aesthetic Perception). *Savremena škola* (Beograd) 15: 369-78; No. 7-8, 1960. (b)
- LAZIĆ, B. "Kako naši učenici vrednuju različite oblike ponašanja svojih srednjoškolskih nastavnika" (How Our Pupils Rate Different Characteristics of Behavior of Their Secondary School Teachers). *Pedagoški rad* (Zagreb) 11: 362-68; No. 7, 1956.
- LAZIĆ, B. *Školski uspjeh učenika u odnosu na položaj u strukturi razrednog kolektiva* (The Relation Between the Educational Attainment of Pupils and Their Status in the Pupils' Collective). Doctoral thesis, Zagreb, 1959. 90 p.
- LEKIĆ, D. "Subjektivno i objektivno proveravanje i ocenjivanje iz poznavanja prirode u IV razredu" (Subjective and Objective Control and Marking of Pupils' Knowledge in Elementary Science—Grade 4). *Pedagoška stvarnost* (Novi Sad) 7: 301-10; No. 5, 1961.
- MANDIĆ, P. "Prilog proučavanju suzbijanja laži i razvijanju istinoljublja" (A Contribution to the Study of Children's Lies and the Development of Sincerity). *Naša škola* (Sarajevo) 11: 2-10; No. 1-2, 1960.
- MARKOVAC, J. "Razvitak navike čitanja" (Growth of the Reading Skill). *Pedagoški rad* (Zagreb) 13: 102-16; No. 3-4, 1958.
- MELVINGER, Z., and BAKOVLJEV, M.: "Neka iskustva s područja dvojezične nastave" (Some Experiences in Bilingual Teaching). *Pedagoška stvarnost* (Novi Sad) 6: 673-83; No. 10, 1960.
- MUŽIĆ, V. "Eksperimentalni prilog nastavi računanja napamet" (An Experimental Study of Teaching Mental Arithmetic). *Bilten Zavoda za unapređjivanje školstva NRH* (Zagreb) 4: 29-35; No. 3, 1959. (a)
- MUŽIĆ, V. "Konstrukcija skale učeničkih sudova o nastavniku i analiza rezultata njezine primjene" (Construction of a Scale of Teacher Rating by Pupils and the Results of Its Application). *Bilten Zavoda za unapređjivanje školstva NRH* (Zagreb) 4: 36-48; No. 3, 1959. (b)
- MUŽIĆ, V. "Test francuske ortografije—eksperimentalna primjena ženevskog testa ORTHO-25 kod naših maturanata" (A French Orthography Test—Experimental Tryout of the Genevese Test ORTHO-25 in the Final Grade of Secondary School). *Bilten Zavoda za unapređjivanje školstva NRH* (Zagreb) 5: 24-38; No. 1, 1960.
- MUŽIĆ, V. *Testovi znanja* (Achievement Tests). Zagreb: Školska knjiga. 1961. 119 p.
- NIČKOVIĆ, R. "Prilog kon prašanjeto za proučavanje na greškite i teškotite vo elementarnata algebarska nastava" (A Contribution to the Study of Mistakes and Difficulties in Elementary Algebra). *Prosvetno delo* (Skopje) 14: 252-65; No. 5-6, 1958. (a)
- NIČKOVIĆ, R. "Sociometrisko proučavanje na učeničkiot kolektiv" (Sociometric Study of Pupils' Collective). *Prosvetno delo* (Skopje) 14: 35-50; No. 1-2, 1958. (b)
- NIČKOVIĆ, R., and OTHERS. *O stavovima odraslih prema oblicima i sadržini opšteg obrazovanja* (Attitudes of Adults Toward Methods and Content of General Education). Beograd: Savezni zavod za proučavanje školskih i prosvetnih pitanja, 1960. 48 p. (Mimeo.)

- NOLA, D. "Analiza sistema ocjenjivanja u obaveznoj školi" (Analysis of the System of Pupils Marking in the Compulsory School). *Savremena škola* (Beograd) 10: 353-78; No. 5-6, 1955.
- ODJEL ZA PEDAGOŠKA ISTRAŽIVANJA ZAVODA ZA UNAPREĐIVANJE ŠKOLSTVA NRH. *Testovi osnovnih računskih operacija i računanja napamet* (Tests of Basic Arithmetic and Mental Arithmetic). Zagreb: Školski servis, 1960. 36 p.
- "Opći Zakon O Školstvu" (The General Law on Education). *Službeni list FNRJ* (Beograd) 14: 746-61; No. 28, 1958.
- "Opći Zakon O Fakultetima I Univerzitetima" (The General Law on Faculties and Universities). *Službeni list FNRJ* (Beograd) 16: 621-28; No. 29, 1960.
- PEAŠINOVIĆ, R. "Eksperimentalni prilog objektivnijem ocjenjivanju školskog znanja" (An Experiment into the Objective Marking of Pupils' Knowledge). *Pedagoški rad* (Zagreb) 13: 290-304; No. 7-8, 1958.
- PIVAC, J. "Međusobni odnosi predmetnih skupina u nastavnom planu osnovne škole" (Relations Between Groups of Subjects in the Elementary School Courses of Study). *Pedagoški rad* (Zagreb) 16: 117-24; No. 3-4, 1961.
- POTKONJAK, N. "O problemu ocjenjivanja" (The Problem of Marking). *Savremena škola* (Beograd) 13: 5-21; No. 1-2, 1958.
- PRVANOVIĆ, S. "Testovi za ispitivanje i ocjenjivanje postignutog uspeha u nastavi matematike" (Tests for Evaluating and Marking Achievement in Mathematics). *Pedagoška stvarnost* (Novi Sad) 5: 479-88; No. 6, 1959.
- RADOJKOVIĆ, A. *Mogućnosti i korištenje upitnika u pedagoškom istraživanju* (The Possibilities of the Use of Questionnaires in Educational Research). Beograd: *Savremena škola*, 1959. 45 p.
- RADOŠAVLJEVIĆ, P. *Uvod u eksperimentalnu pedagogiju* (An Introduction to Experimental Pedagogy). Zagreb: Pedagoško književni zbor, Vol. 1; 1910. 372 p, Vol. 2: 1912. 370 p.
- RADOŠAVLJEVIĆ, V., and JUHAS, M. *Rasprostranjenost slobodnih aktivnosti učenika osnovnih škola; gimnazija i stručnih škola* (The Extension of Extracurricular Activities of Pupils of Elementary Schools, Gymnasiums and Vocational Schools). Beograd: Šavezni zavod za proučavanje školskih i prosvetnih pitanja, 1959. 193 p. (Mimeo.)
- RODIK, M. "Neki problemi nastave matematike u osnovnim školama" (Problems of Teaching Mathematics in Elementary School). *Život i škola* (Osijek) 9: 327-33; No. 7-8, 1960. (a)
- RODIK, M. "Što su pokazali testovi znanja iz matematike provedeni u prvim razredima osječnih srednjih škola na početku školske godine 1960/61" (Results of Achievement Tests in Mathematics in the First Grade of Secondary School at the Beginning of the School Year 1960/61 in Osijek). *Život i škola* (Osijek) 9: 380-89; No. 9-10, 1960. (b)
- ROT, N. and VASIĆ, Z. "Korištenje testova pri ispitivanju i ocjenjivanju učenika" (The Use of Tests in Pupils' Examinations and Evaluations). *Savremena škola* (Beograd) 11: 68-81; No. 1-2, 1956.
- SALAMON, T., and STARCEVIĆ, F. "Odnos između kvaliteta i brzine rada u procesu praktične nastave u industrijskoj školi metalnog smjera" (Relations Between Speed and Precision in the Work of the Pupils of the Metal Industrial School). *Stručno obrazovanje* (Rijeka) 1: 84-102; No. 3, 1957.
- SAPUNAR, Ž. "Ispitivanje stručnosti učenika industrijskih škola i škola učenika u privredi metalnog smjera na kraju prve godine školovanja" (Examination of Technical Knowledge of Pupils of Industrial Schools and Apprentice Schools for Metalwork at the End of the First School Year). *Stručno obrazovanje* (Rijeka) 1: 5-89; No. 4, 1957.
- SCHMIDT, V. *Uvod u pedagoško metodologiju* (Introduction to the Methodology of Educational Research). Ljubljana: Zavod za napredek školstva LRS, 1960. 87 p.
- ŠIMLEŠA, P., and OTHERS. "Stanje pravopisne pismenosti učenika osnovne škole" (Level of Orthography of Elementary-School Pupils). *Bilten Zavoda za unapređivanje školstva NRH* (Zagreb) 4: 1-28; No. 3, 1959.
- ŠIMLEŠA, P., and OTHERS. "Utjecaj ljetnih školskih praznika na pravopisne navike" (The Influence of Summer Vacations on the Orthography Level). *Bilten Zavoda za unapređivanje školstva NRH* (Zagreb) 5: 1-6; No. 1, 1960.
- ŠKALKO, K. *Ispitivanje i ocjenjivanje u školi* (Examining and Marking in the School). Zagreb: Pedagoško-književni zbor, 1951. 215 p.

- ŠMIT, V. *Kako danas da razvijamo pedagošku nauku kod nas* (How To Develop Our Science of Education Today). Beograd: Savremena škola, 1958. 130 p.
- SOROKIN, B. *Komparativna valjanost testova znanja* (Comparative Validity of Achievement Tests). Doctor's thesis, Zagreb, 1960. 89 p.
- STALNA KONFERENCIJA GRADOVA JUGOSLAVIJE. *Društveno upravljanje školama u gradovima i industrijskim mestima* (Social Management of Schools in Urban Areas). Beograd: Stalna konferencija gradova Jugoslavije, 1957. 80 p. (Mimeo.)
- STEVANOVIĆ, B. *Eksperimentisanje u oblasti vaspitanja* (Experimentation in Education). Beograd: Savremena škola, 1958. 50 p.
- SUPEK, R. "Bratstvo i drugarstvo omladine na Autoputu" (Fraternity and Comradeship of Young People on the Voluntary Labor Project: Highway). *Naše teme* (Zagreb) 2: 717-32; No. 6, 1958. (a)
- SUPEK, R. "Smisao jedne radne akcije" (The Sense of a Voluntary Labor Project). *Naše teme* (Zagreb) 2: 532-42; No. 4-5, 1958. (b)
- SUPEK, R. "Neki problemi rukovođenja i discipline na radnim akcijama" (Problems of Leadership and Discipline on Voluntary Labor Projects). *Naše teme* (Zagreb) 3: 80-95; No. 1, 1959.
- TOLIČIĆ, I. "Korelacija različnih sposobnosti učenice I. in II. razreda osnovne škole z njihovim učnim uspehom v posameznih predmetih" (The Correlation Between Different Aptitudes of Pupils of the First and Second Grade of Elementary School with Their Success in Particular Subjects). *Sodobna pedagogika* (Ljubljana) 8: 30-44; No. 1-3, 1957.
- TOLIČIĆ, I. *Otroka spoznamo v igri* (We Realize the Knowledge of the Child Through His Play). Ljubljana: Državna založba Slovenije, 1961. 110 p.
- TROJ, F. *Prilog pitanju proveravanja znanja i ocenjivanja učenika u našim školama*. (A Contribution to the Problem of the Control and Marking of Pupils' Knowledge in Our Schools). Beograd: Nolit, 1957. 201 p.
- TROJ, F. *Osnovni pojmovi iz psihološke i pedagoške statistike* (Basic Concepts of Psychological and Educational Statistics). Beograd: Savremena škola, 1958. 60 p.
- TROJ, F., and OTHERS. "Rezultati ispitivanja testovima znanja učenika u osmom razredu osnovne škole" (Achievement Test Results in the Eighth Grade of Elementary School). *Bilten Zavoda za unapređenje školstva NRS* (Beograd) 2: 1-32; No. 3, 1960.
- VREČIĆ, D. "Tematika u crtežima dece od 7-11 godina" (Themes of Children's Free Drawings in Ages 7-11). *Pedagoška stvarnost* (Novi Sad) 7: 329-35; No. 5, 1961.
- VUKANOVIĆ, R. "Utjecaj porodičnih prilika na školski uspjeh i socijalno ponašanje" (The Influence of Family Conditions on Scholastic Achievement and Social Behavior). *Život i škola* (Osijek) 7: 113-27; No. 3-4, 1958.
- "Zakon o Načinu Financiranja Naučnih Ustanova" (The Law on the Financing of Scientific Institutions). *Službeni list FNRJ* (Beograd) 16: 469-71; No. 23, 1960.
- "Zakon o Organizaciji Naučnog Rada" (The Law on the Organization of Scientific Work). *Službeni list FNRJ* (Beograd) 13: 641-47; No. 34, 1957.
- "Zakon o Pedagoškim Akademijama" (The Law on Teacher Training Colleges). *Narodne novine NRH* (Zagreb) 16: 302-307; No. 32, 1960.
- "Zakon o Saveznom Fondu za Naučni Rad" (The Law on the Federal Fund for the Scientific Work). *Službeni list FNRJ* (Beograd) 16: 485-87; No. 24, 1960.
- "Zakon o Visokoškolskom Obrazovanju" (The Law on College Education). *Narodne novine NRH* (Zagreb) 17: 148-159; No. 27, 1961. Particularly Paras. 3, 11, 30.
- ŽALAC, T. "Neki rezultati ispitivanja u školi za opće obrazovanje radnika u Zagrebu" (Some Results of an Inquiry in the School for General Education of Workers in Zagreb). *Obrazovanje odraslih* (Zagreb) 5: 41-48; No. 4, 1959.
- ZVONAREVIĆ, M. *Psihološki i socijalni faktori omladinskog kriminaliteta* (Psychological and Social Factors of Juvenile Delinquency). Doctor's thesis, Zagreb, 1955. 163 p.
- ZVONAREVIĆ, M. "Analiza ankete o seminaru u Umagu" (Analysis of an Inquiry About a Seminary in Umag). *Obrazovanje odraslih* (Zagreb) 6: 37-42; No. 1, 1960.
- ZVONAREVIĆ, M., and BROZOVIĆ, M. "Utjecaj estetskog obrazovanja na doživljavanje i ocenjivanje 'apstraktnih' i 'realističkih' slika" (The Influence of Aesthetic Education on the Appreciation and Evaluation of "Abstract" and "Realistic" Pictures). *Pedagoški rad* (Zagreb) 12: 286-89; No. 12, 1958.

CHAPTER XI

Poland

JAN KONOPNICKI

ALTHOUGH POLAND had the first ministry of education in Europe (the end of the eighteenth century), energies have been directed toward the strengthening of national integrity and unity rather than toward formulating a science of education. Faced with rebuilding her educational system following both World Wars I and II, Poland turned to readily available foreign examples rather than to developing an educational science of its own. These efforts in turn prevented the allocation of funds for the kinds of experimental educational research which today are so expensive. Thus for historical and economic reasons, specialists in education directed most of their attention toward philosophical speculations rather than toward empirical research, though some of the latter is being currently pursued.

During the rebuilding of schools after World War II, Okón (1951) used objective tests to compare the levels of achievement of pupils in the primary and secondary schools with those based on curricular statements. The study of 154 primary and secondary schools showed a great discrepancy between the desired standard of achievement in terms of curricular requirements and the actual level of achievement as measured.

Recent Developments

As a result of the school-reform program, the period since 1955 has witnessed an increasing amount of educational research. There are now at least 25 schools in Poland carrying on experimental programs. Nine of them are experimenting with technical programs. Eight are continuing Bartecki's (1958) experiment with "activation," a combination of the discussion method with nonhomogeneous grouping within classrooms. Two schools are experimenting with self-education; three, with education of backward children; and three additional ones, with various approaches.

In one of the experiments cited, Konopnicki (1961) used individual instruction to allow retarded or backward children to be promoted from lower or upper classes of the primary school. Objective diagnostic tests were prepared in arithmetic and in silent reading. An interesting incidental finding, which resulted from a comparison of test results with teacher estimates, showed that teachers estimated accurately for the average child but quite inaccurately for the brilliant or backward child.

The regular teacher gave a program of individual instruction during an afternoon period over two years. Although participation was voluntary, all but a few did participate. The percentage of children not promoted,

which varied from 7 percent to 15 percent in the typical school, was reduced to 2.5 percent. The objective tests showed what seemed to be quite good progress.

In another study, Konopnicki (1957) attempted to increase the accuracy of diagnosis of a child's behavior disorder that was seemingly associated with a lack of success in school work, in order to reduce the length of therapeutic procedures. Until 1949, children suspected of a disorder were sent to the out-patient department of a child-guidance clinic in Wrocław for diagnosis following medical and psychological examination. Because the results of the procedure had been equivocal, the complex cases beginning in 1949 were sent to a club for a period of four to six weeks. Although the child remained at home, he came to the club six times per week. The three hours of daily stay in the club were divided as follows: (a) one hour for school homework, (b) one hour for organized play, and (c) one hour for free individual play. The number of children never exceeded 10 or 12, and there were always three or four observers.

Intelligence, achievement, and personality tests were administered, and preliminary interviews with parents and teachers were completed during the first week. On the basis of the findings, a decision on what additional observations were necessary was made. At the end of the stay in the club a collective diagnosis of the case was made, and detailed instructions for home and school were developed. Some children were sent to boarding schools; others, to educational institutions. Apparently as a result of modifications in educational methods and environment, 80 out of 150 cases thoroughly examined in this manner over a period of three years appeared to have changed to what was judged a satisfactory degree, and 70 others were thought to need additional therapy.

A follow-up study of the whole educational process was undertaken in 1957 on behalf of the Educational Psychology Committee of the Poland Academy of Sciences. Fourteen hundred youth were examined by means of an achievement test based on the curriculum of the primary school (7-14 years of age), an intelligence scale very similar to the *Otis Group Intelligence Scale*, and a 30-50 minute interview. Recently published results in *Studia Pedagogiczne* (1961) concluded among other things that though young people remember verbal knowledge (in a somewhat chaotic fashion), their application of this knowledge is very poor. Subject-matter interests were found to be a function of factors other than those found in school.

Future Objectives

The goal of a series of experiments to be carried on over a period of time is the organization of school work in such a way that the student seeks to learn. The current series of investigations emphasizes the use of small groups of three to five pupils so chosen as to include both strong and

weak pupils in each group. In experiments carried out in 84 schools of different levels and types, this method has been found advantageous for both the ablest and the weakest pupils.

The groups are given problems to solve by the teacher in accord with his instructions. Contrary to the school tradition of many years, members of each group are asked to deliberate and to agree on an answer. The role of the teacher is to organize the work and to direct it unobtrusively. He is to listen to discussion, direct it, evoke doubts, and point out inconsistencies.

Entering actively into the situation, pupils seem to perceive it as similar to competition in sports. The intellectual balance of the groups makes competition possible. The work of a given group is, as a rule, compared with that of the other groups in class discussion. Preliminary results would seem to indicate that successes achieved in groups by individual pupils and in classes by whole groups encourage all pupils to learn. Thus the emphasis in this experimentation is not so much on the method of teaching as it is on the organization of the classroom, so as to improve learning through control of motivational processes.

Bibliography

- BARTECKI, JAN. *Aktywizacja procesu nauczania poprzez zespoły uczniowskie* (Implementation of the Teaching Process Through Student Groups). Warszawa: Państwowe Wydawnictwo Naukowe, 1958.
- KONOPNICKI, JAN. *Zaburzenia w zachowaniu się dzieci szkolnych i środowisko* (Disturbance in the Behavior of School Children and Their Environment). Warszawa: Państwowe Wydawnictwo Naukowe, 1957.
- KONOPNICKI, JAN. *Problem opóźnienia w nauce szkolnej* (The Problem of Retardation in Schools). Wrocław-Kraków: Zakład Nar. im. Ossolińskich, 1961.
- OKOŃ, W. *Badanie wyników nauczania w szkołach ogólnokształcących* (Study of the Results of Teaching in Nonvocational Schools). Warszawa: Nasza Księgarnia, 1951.
- Studiów Pedagogicznych* (Pedagogical Studies). Wrocław-Kraków: Zakład Nar. im. Ossolińskich, 1961. IX Tom.

CHAPTER XII

Spain

VICTOR GARCIA HOZ

EDUCATIONAL RESEARCH in Spain prior to 1956 was summarized in *Revista Española de Pedagogía* (1958). This chapter concentrates on research published since that review. An exhaustive listing of educational publications in Spain was offered each December by the journal *Bordón* (1956, 1957, 1958, 1959, 1960). Bibliographies were published on specific subjects, such as scholastic and professional orientation (Alcaraz Lledo, 1959); bibliographical selection and orientation (Tutor, 1960a); educational psychology (Garcia Yague, 1958); and family education (Tutor, 1960b).

Philosophical and Historical Literature

The increasing complexity of educational problems, combined with the application of new educational-research techniques to only parts of these problems, has produced fragmented work which is difficult to systematize. As a result, an increasing amount of attention has been devoted to finding a systematic approach to educational problems. García Hoz (1960) developed the principles of such a systematic approach, which takes the characteristics of the human being as its starting point. The principles resulted from some years of reflection and from interchanges of points of view among those working at the Instituto de Pedagogía del Consejo Superior de Investigaciones Científicas (Institute of Pedagogy of the Superior Council of Scientific Investigation).

Redondo (1959) wrote a rigorous philosophical investigation of education viewing communication as the central phenomenon in the educational process. It included a historical study of the evolution of Western thought from the Hellenic mind through existentialism. The author considered both cognitive and affective aspects of communication and included not only communication with others, but also communication with one's self (which in the American literature would be referred to as development of the self-concept). Redondo suggested four means by which self-knowledge is gained: reflection (introspection), the experiencing of one's activities, examination of one's behavior and works, and the perceptions others hold of one.

Redondo examined communications with others by starting with the mediating role of three categories of symbols: (a) words, (b) gestures in sign language, and (c) acts and works. He noted some of the conditions necessary to communication, concentrating particularly on the intention

of the initiator of the message to communicate and the intention of the receiver to understand.

Historical investigations centering around the Colegios Mayores, which gave life to the Spanish universities, are gaining new vigor today (Ajo G. Sainz de Zuñiga, 1958; Simon Diaz, 1959; Febrero, 1960). The first volume of a fundamental history of education by Galino Carrillo (1960) was published. The volume, which was limited to the ancient and middle ages, included several representative cultures and began with the history of each of the cultures (largely old Eastern ones). The author described the development of education, more through religion, politics, and folklore than through schools. This opens a wide area to investigation, since the school, particularly as a pervasive influence, is a relatively late comer on the educational scene. The author argued that education, perceived as assimilation of the standards and styles of life of the adults of the culture by the younger generation, appears in all societies regardless of how primitive they are.

Educational Psychology

The relation of psychology to methods of teaching appeared to be an attractive field to the studious. Palmés (1958) contributed to knowledge of how an understanding of the pupil is fundamental to a determination of his educational treatment. Sanchez Jimenez (1961) emphasized techniques of diagnosis and control in contributing to the same topic. Ercilla (1958) studied the adaptation of standardized tests from other countries to the Spanish environment. Garmendia de Otaola (1959) studied the use of the *Szondi Test* in the diagnosis of complex personality problems. Pinillos (1960) studied the reliability and validity of the C.E.P. Personality Questionnaire. Garcia Hoz (1961) and Garcia Manzano and others (1959) described the validation and standardization of tests designed for guidance purposes.

Rodriguez (1959) published an important study of the aesthetic value of infants' plastic creations. Through studying children's art in several countries, the author developed an understanding of these works as an expression of the infant's mind and drew implications for infants' education.

Diaz Arnal (1959) also studied art, but concentrated on the possibilities of drawing for diagnosis and treatment of the mentally handicapped. The author contrasted drawings of the mentally handicapped with drawings of children of normal intelligence, noting the extent to which normals were better able to express dynamic ideas with much greater reality and lively expression, despite limitations in artistic skill. The mentally handicapped students' drawings were duller than those of normals. They included reminiscences of experience, but were less lively intellectually. The drawings also showed the desolation that prevails in the psyche of many normal

children living in orphanages, where they are deprived of the affective tone which gives warmth and life.

Educational Sociology

Although few published works were concerned with the study of social factors relating to education, those which did appear were largely of an introductory nature (Garcia Hoz, 1959; Fraga, 1959). Bousquet (1960) studied some of the political and economic factors of education. Montoya (1961) examined the educational possibilities of Moreno's sociogram, for which the data were gathered by interviews rather than questionnaires.

Garcia Hoz (1959) described the development of *paidocenosis*, a new concept to facilitate the study of the different influences on education. Paidocenosis, derived from the Greek words meaning "to teach" and "common," refers to the whole series of educational stimulations that attempt to develop a particular way of living and reacting in the pupil. Some experiences disappear with the passing of time, leaving little trace behind. Others continue to work in exceptionally deep ways—a conversation, a perusal, a word of courage, or a scolding which we know "we will remember forever." Paidocenosis considers experiences lying between these extremes which, joined with other stimulations, form a series or a constellation to make up the educational process. Thus, each family or group of playmates can be considered, from the educational point of view, as a series of stimulations leading to the development of particular behaviors different from other families or other groups of playmates. The influence of paidocenosis does not appear as specific learnings or particular features of the personality; its influence, which is deeper and more difficult to delineate, affects the whole personality. In a sense, every paidocenosis is a social environment or community permanently influencing those involved in it. The family, the school, the profession, and the nation can be considered as paidocenosis (Garcia Hoz, 1960).

Methods of Teaching

Work in the area of teaching methods centered on the teaching of language and mathematics. Studies of vocabulary in the teaching of reading, which have a certain tradition in Spain, have been carried to the point of describing the specific vocabulary used at different stages of life (Serrano Vaquero, 1957). Perez Vazquez (1958) studied the relationship between the commonly used vocabulary and a specific one; in this instance, that of history. Palau (1960) contributed one of the series of studies initiated by the emphasis on the eradication of illiteracy in Spain.

An investigation was begun of the use of the child's intuitive notions to initiate mathematics teaching until the formation of what might be more properly considered mathematical thought. The leader of this work in

Spain, Puig Adam (1960), unfortunately disappeared, but his work was edited last year. Teaching calculation has been studied very carefully by Junquera Mune (1961) in a voluminous work.

Guidance

In Spain the concept of guidance is increasing in both importance and scope. It is perceived as a means through which students should come to know themselves so that they may be better adjusted to society and can contribute to the social life. Two bibliographies in the field of guidance, those of Alcaraz Lledo (1959) and Tutor (1960b), have already been mentioned. Mallart (1959) continued the study of certain problems in which psycho-techniques, professional orientation, professional study, and certain work opportunities are reciprocally interrelated. A series of interesting investigations from the point of view of Roman Catholic guidance were gathered together by Valencia (1958).

School Administration

Investigations of the Instituto Nacional de Estadística (National Institute of Statistics) continued to be the best source of facts and statistics on Spanish education. The Institute published studies of the general statistics of education in Spain (Presidencia del Gobierno, 1958) and specialized studies of primary education (Presidencia del Gobierno, 1959a) and higher education (Presidencia del Gobierno, 1959b). The higher-education study showed the absolute and relative increase in both teaching staff and pupils, noting especially the increasing role of women. Male students increased two-thirds since 1940 (from 31,000 to 52,000), while female students increased almost three times (from 4000 to 12,000). Male teachers increased one and a half times (from 1800 to 4400), while female teachers increased six times (from 66 to 394). Garcia y Garcia (1958) studied the secondary-school inspection which has recently been organized in Spain.

Family Education

There have been several investigations in this area, probably due to the influence of international organizations for the protection of children, which have highlighted the influence of the family in education and the damage to the child's development that results in deficiencies in family life. Bibliographies by Garcia Yague (1958) and Tutor (1960a) gave evidence of this concentration of effort. Sanchez Vizcaino (1961) studied the problem of family maladjustments and noted the influence of conjugal harmony on family life. One of the most important works in this area was by Tusquets (1958), who dealt with the question of family influence on

education under four headings (historical, ethical, psychological, and methodological) and treated each with the careful documentation and brave judgment that distinguish him. Among others, he dealt with such questions as these: (a) What basis has the assertion by one of our well-known authors that the horde existed before the family and the club before the home? (b) To what extent are psychiatric methods applicable to the familial institution? (c) How should parents use their authority?

Two Important Areas of Investigation

Among the most important works being carried on by the Instituto de Pedagogía del Consejo Superior de Investigaciones Científicas (Institute of Pedagogy of the Superior Council of Scientific Investigations) are two which will be briefly described: the systematic historical work and the studies of language.

The problem of systematizing the study of educational problems is an old question for the Institute staff. The two usual ways of arranging educational questions and studies have been carefully examined: the alphabetical form used mainly by encyclopedias of education and the systematic one which attempts to order educational doctrine according to the relations among the different educational questions. Despite the interest which an alphabetical inventory of educational knowledge might hold, it seemed more useful to undertake the problem of systematization. After many meetings, the Institute group arrived at a classification of educational problems which has a double utility. On one hand, it has served as a plan for the systematic classification of educational documents, and, on the other, it has served to establish the general lines along which systematic work in the educational sciences may be planned.

Of the systematic studies stemming from this classification system, those most advanced are in the area of historical research; one of these, by Galino Carrillo (1960), has already been published. Though this volume was conceived within the classical system, which orders educational problems chronologically and geographically, a new arrangement will be forthcoming which should allow the study of each of the principal educational subjects through different times.

The studies of language that were initiated in 1943 aimed at an exhaustive study of the sociological, psychological, and pedagogical aspects of language. Initial studies concentrated on the quantitative, sociological, and psychological aspects. Teaching methods have been the subject of many studies published in *Revista Española de Pedagogía* and in *Bordón*. These studies permitted the development and validation of tests of vocabulary necessary to the research. Vocabulary has also been used in the study of various personality aspects, using the technique of word qualification to study emotional-sentimental reaction. Studies of social diagnosis through language have also been initiated but are still in an embryonic state.

Bibliography

- AJO G. SAINZ DE ZUÑIGA, C. M. *Historia de las Universidades Hispánicas* (History of the Spanish Universities). Tomo II. Avila: Centro de Estudios e Investigaciones Alonso Madrigal, 1958.
- ALCARAZ LLEDO, M. JOSEFA. "Bibliografía sobre orientación escolar y profesional" (Bibliography on Scholastic and Professional Orientation). *Revista de Educación* (Madrid) No. 96: 41-65; April 1959.
- BORDÓN. "Bibliografía pedagógica española 1956" (Bibliography of Spanish Pedagogy). *Bordón* No. 64, December 1956.
- BORDÓN. "Bibliografía pedagógica española 1957." *Bordón* No. 72, December 1957.
- BORDÓN. "Bibliografía pedagógica española 1958." *Bordón* No. 80, December 1958.
- BORDÓN. "Bibliografía pedagógica española 1959." *Bordón* No. 88, December 1959.
- BORDÓN. "Bibliografía pedagógica española 1960." *Bordón* No. 96, December 1960.
- BOUSQUET, J. *Política y Economía de la Educación* (Politics and Economics of Education). Madrid, 1960.
- DIAZ ARNAL, ISABEL. *El Lenguaje Gráfico del Niño Deficiente* (The Graphic Language of the Deficient Child). Madrid: Consejo Superior de Investigaciones Científicas, 1959.
- ERCILLA, JOSÉ DE. "El método de Alberto Huth" (The Method of Alberto Huth). *Perspectivas Pedagógicas* (Barcelona) No. 2: 124-28; 1958.
- FERRERO, M. A. *La Pedagogía de los Colegios Mayores* (The Pedagogy of the Higher Schools). Madrid: Consejo Superior de Investigaciones Científicas, 1960.
- FRAGA, MANUEL. "Factores sociológicos en la planificación de la educación (Sociological Factors in Educational Planning). *Revista de Educación* (Madrid) No. 107: 54-58, December 1959.
- GALINDO CARRILLO, M. ANGELES. *Historia de la Educación* (History of Education). Tomo I. Madrid, 1960.
- GARCIA HOZ, VÍCTOR. "Concepto y contenido de la sociología de la Educación" (Concept and Content of the Sociology of Education). *Bordón* Nos. 86-87: 337-64; October-November 1959.
- GARCIA HOZ, VÍCTOR. *Principios de Pedagogía Sistemática* (Principles of Systematic Pedagogy). Madrid, 1960.
- GARCIA HOZ, VÍCTOR. "Una evaluación de la emotividad: El test de calificación de palabras" (An Evaluation of Motivation: The Test of Quality of Words) *Bordón* Nos. 99-100: 115-28; March-April 1961.
- GARCIA MANZANO, E., and OTHERS. "La prueba de memoria con sentido de García Yague, precisión, validez y baremos" (The Proof of Memory in the Thinking of García Yague: Precision, Validity, and Measurement). *Bordón* Nos. 81-82: 57-91; January-February 1959.
- GARCIA Y GARCIA, MATILDE. "La Inspección de Enseñanza Media en medio siglo de Legislación española" (The Inspection of Intermediate Instruction in Half a Century of Spanish Legislation). *Bordón* No. 73: 21-27; January 1958.
- GARCIA YAGUE, J. "Bibliografía crítico-sistemática de psicopedagogía familiar" (A Critical-Systematic Bibliography of Family Psychology). *Revista de Educación* No. 85: 50-55; October, 1958.
- GARMENDIA DE OTAOLA, A. "El test de Szondi y algunos problemas profundos de la personalidad" (Szondi's Test and Certain Profound Problems of Personality). *Revista de Psicología General y Aplicada* Nos. 51-52: 739-56; July-December 1959.
- JUNQUERA MUNE, L. *Didáctica del cálculo* (Didactics of Calculus). Madrid: Labor, 1961.
- MALLART, JOSÉ. *Orientación funcional y formación profesional, Psicotecnia, pedagogía del trabajo, profesología, colocación* (Functional Guidance and Professional Development: Psychotechnology, Teaching About Work, Professional Training, and Placement). Madrid: Espasa-Calpe, 1959.
- MONTROYA, M. N. *Utilización pedagógica de la sociometría* (Pedagogical Use of Sociometry). Madrid, 1961.
- PALAU, E. *Sistema fotosilábico para la enseñanza de la lectura y la escritura* (Photosyllabic System for Teaching Reading and Writing). Madrid: E. Palau, 1960.
- PALMES, FERNÁNDO M. "Cómo informar sobre la personalidad propia y ajena" (How May One Learn About One's Own Personality and the Personalities of Others?). Barcelona: Subirana, 1958.

- PÉREZ VAZQUEZ, M. TERESA. *Estudio del vocabulario histórico usual y los textos de historia* (Study of the Common Historical Vocabulary and History Texts). Madrid, 1958.
- PINILLOS, JOSÉ LUIS. "Consistencia y validez del cuestionario de Personalidad C.E.P." (Reliability and Validity of the C.E.P. Personality Questionnaire). *Revista de Psicología General y Aplicada* No. 53: 65-67; January-March 1960.
- PRESIDENCIA DEL GOBIERNO. *Estadística de la enseñanza en España* (Statistics of Education in Spain). Madrid: Instituto Nacional de Estadística, 1958.
- PRESIDENCIA DEL GOBIERNO. *Estadística de la Enseñanza Primaria y de las Escuelas del Magisterio en España* (Statistics of Primary Education and of Teacher Training Schools in Spain). Madrid: Instituto Nacional de Estadística, 1959. (a)
- PRESIDENCIA DEL GOBIERNO. *Estadística de la Enseñanza Superior en España* (Statistics of Higher Education in Spain). Madrid: Instituto Nacional de Estadística, 1959. (b)
- PUIG ADAM, PEDRO. *La Matemática y su enseñanza actual* (Mathematics and current Teaching Methods). Madrid: Ministerio de Educación Nacional, 1960. 465 p.
- REDONDO, EMILIO. *Educación y Comunicación* (Education and Communication). Madrid: Consejo Superior de Investigaciones Científicas, 1959.
- REVISTA ESPAÑOLA DE PEDAGOGÍA. "Investigación Pedagógica Mundial (World-Wide Pedagogical Investigation)". *Revista Española de Pedagogía* Nos. 62 and 63, April-September 1958.
- RODRIGUEZ, JOSEFINA. *El arte del niño* (Children's Art). Madrid: Consejo Superior de Investigaciones Científicas, 1959.
- SÁNCHEZ JIMÉNEZ, JULIAN. *Conocimiento del educando* (Understanding the Learner). Madrid, 1961.
- SÁNCHEZ VIZCAINO, M. JESÚS. *La inadaptación familiar* (Family Non-Adaptation). Madrid, 1961.
- SERRANO VAQUERO, JULIANA. *Vocabulario funcional en el párvulo* (The Functional Vocabulary of the Infant). Madrid, 1957.
- SIMÓN DÍAZ, J. *Historia del Colegio Imperial de Madrid* (History of the Imperial College of Madrid). Tomo II. Madrid: Instituto de Estudios Madrileños, 1959.
- TUSQUETS, JUAN. *Revisión de la Pedagogía familiar* (Review of Family Pedagogy). Madrid: Consejo Superior de Investigaciones Científicas, 1958. 126 p.
- TUTOR, M. JESÚS. "Selección bibliográfica sobre orientación" (Bibliographic Selection on Guidance). *Bordón* Nos. 90-91: 103-202; February-March 1960. (a)
- TUTOR, M. JESÚS. "Selección bibliográfica sobre educación familiar" (Bibliographic Selection on Family Education). *Bordón* Nos. 94-95: 441-54; October 1960. (b)
- VALENCIA, GREGORIO. *Adolescencia, Colegio y Dirección espiritual* (Adolescence, School, and Spiritual Direction). Madrid: ERC, 1958.

CHAPTER XIII

The United Kingdom

W. D. WALL and K. M. MILLER*

DURING THE PAST five years a marked increase in official interest in educational research has occurred. Although much more needs to be done to encourage educational inquiry, the Ministry of Education has decided to set up a small fund for research, an information branch, and a unit for study of curriculum.

Methods of Teaching

Although more than 100 investigations concerned with teaching methodology were reported in the professional literature, only a few representative works will be cited. Consideration was given to teaching procedures in various subject-matter areas, to motivational factors in learning, and to both aptitude and noncognitive variables involved in the selection and training of teachers.

School Subjects

A representative investigation in the teaching of arithmetic at the primary level was the one by Lee (1959); the difficulties in the learning of mathematics constituted the subject of a paper by Skemp (1961). In science teaching, the studies of Curr (1960), King (1961), and Peel (1955, 1959) were noteworthy. Peel's work exemplified the tendency, observed by the authors, for investigators to emphasize the relationship of psychological processes to methods of teaching and to planning of the curriculum.

More than a score of studies related to reading were noted, of which those by Ace (1956), Bartlet and Shapiro (1956), Ravenette (1961), Roberts (1960), and Vernon (1956) could be considered typical. In the related areas of spelling and reading, the Institute of Education in London has undertaken a large-scale experimental investigation of the effectiveness of an augmented Roman alphabet, although no findings have yet been published.

At the level of higher education—particularly in the universities—there has been considerable uneasiness about teaching methods. Two government

*We are indebted to Mrs. Floud, who allowed us to examine an unpublished preliminary report on the social characteristics of teaching, and to D. A. Pidgeon and J. E. Biggs, who permitted us to study reports on surveys and on arithmetic in the primary school.

committees are concerned with problems of teaching methodology, although research evidence has been scant. Most actively concerned have been the medical schools. The report of Hopkins, Malleson, and Sarnoff (1958) concerning success and failure of university students was especially informative.

Particularly noticeable has been the amount of educational research pertaining to the physically and neurologically handicapped. For example, Zangwill's (1960) neurological studies of laterality pointed out, in a definitive manner, educational implications associated with cerebral dominance.

Motivation

In his investigation of punishment within the framework of moral values, Wheeler (1959) found that the attitudes which adolescents hold toward such punishment are those of past generations and incompatible with current principles of education.

Psychological Variables in Teacher Selection and Teacher Training

Although Evans (1957) found that breadth of interests was not related to success in teacher training, the Training College Research Group (1960), in another study, did report that students with precollege teaching experience tended to be more successful in their courses. Three studies that seemed to break new ground were those of Collins (1959), who carried out a follow-up study of former graduate student teachers; of Oliver (1956), who assessed factors of teaching ability in physical education; and of Robertson (1957), who analyzed the opinions of supervisors as to the attributes of successful graduate student teachers. In the study of teachers in training, Hewitt (1960) assessed the competence of university students in English; Hope and Storer (1957) evaluated proficiency in arithmetic skills; and Lovell and White (1958) investigated the influences underlying choice of subjects in school and in training college.

School and School-System Organization

The selection and allocation of students, the nature of the organization of schools, and the use of examinations and tests in evaluation of the educational program have represented traditional areas of educational research. During the past five years there has been no lessening of interest or productivity of research in these fields. Of the more than 70 studies encountered in the literature, only four will be cited.

One noteworthy symposium on use of intelligence tests in allocation and selection of students consisted of five papers of which the one by Heim and Watts (1957) was representative. Closely related to problems of selection

and guidance were those of wastage of student talent and of termination of study, as exemplified by the failure of students to complete courses both in grammar schools and in technical colleges. More than 15 studies were concerned with these problems, of which the one by Allen (1960) concerning examination performances was typical.

The controversial problem of grouping by ability, known as streaming, was the subject of at least nine papers with somewhat conflicting findings. Perhaps Daniels' (1961) suggestion of the importance of the attitude of the teacher toward grouping would account for discrepancies in the experimental findings of several of the investigators.

Cultural and Family Factors

The importance of cultural factors of a psychological and sociological nature in relation to educational progress and attainment has been recognized by a large number of research workers. Thus such interrelated parameters as parental interest and encouragement, home environment, and social class have served as convenient frames of reference in much recent educational research. At least 30 studies were found in which one or more of these parameters were central to the problem investigated. Only two published reports will be mentioned.

For example, Chazan (1959) found that of more than 60 grammar-school children referred to a child-guidance clinic, negative parental attitudes appeared twice as frequently as any of the other factors studied. However, by far the greatest amount of interest has been centered upon the relationship of social class and social structure to educational attainment. In the National Survey of Health and Development, investigators have carried out a large-scale normative study. Although their findings have not been published at the time of this writing, it can be reported that the index of social class of parents was positively related to achievement in school when the intellectual level of the children was controlled.

Another large-scale study that has been providing reports over a number of years is the Scottish Mental Survey of children born in 1936, which has been carried out by the Scottish Council for Research in Education (1953). Educational implications of recent findings have been cited—especially those dealing with family migration, family size, size of school, and class size.

Educational Psychology

Numerous indeed have been investigations concerned with abilities and thought processes, personality and motivation, and personal and moral values. Of more than 75 articles found in an exploration of the psychological literature, fewer than 20 will be cited.

Abilities and Thought Processes

The earlier stress on determining the nature of intelligence and special abilities—especially in relation to theories of intelligence and to the heredity-environment controversy—has largely been supplanted by an increasing interest in the development, or appearance, of particular abilities or thought processes. Much of this interest has been stimulated by Piaget's work. The studies of specific aspects of mental development, particularly as related to education, fall into the following groups: concrete reasoning-conservation; concrete reasoning-classification; and seriation and formal reasoning.

In the area of conservation in concrete reasoning, the articles of Churchill (1958), concerning the development of number concepts in children, and of Lovell (1959), who considered children's development of spatial concepts, were noteworthy contributions. With respect to classification in concrete reasoning, which involves the ability to organize the objects of experience into qualitatively distinct classes or groups and the ability to understand the basic relations of class membership, disagreements were apparent regarding the ages at which abilities related to this classification mature. Beard (1960), Carpenter (1955), and Lovell (1959) suggested in varying contexts that the abilities of British children developed at earlier ages than those reported for the children of Geneva. Regarding the final stage of thought development—logical reasoning—many important contributions such as doctoral dissertations have not been published. Papers by Annett (1959), Lunzer (1959), and Wheeler (1958) have been noteworthy, as were five studies concerning children's scientific concepts and interests reported in the February 1961 issue of the *British Journal of Educational Psychology*, of which the one by Pheasant (1961) was illustrative.

In summary, one can say that the completed and ongoing work is providing teachers with a better understanding of the appropriate ways of showing a child that his present level of thinking is inadequate and of offering him guidance in developing new modes of thought to be integrated with existing cognitive processes. The trend now is to extend this method of investigation to adolescent thinking, about which relatively little research has been done.

Personality and Motivation

The development of moral values in children was the subject of a symposium, the six papers of which appeared between 1958 and 1960 in issues of the *British Journal of Educational Psychology*. Many ongoing studies have attempted to ascertain the ways in which classroom activities and experiences contribute to the development of moral values. Eysenck (1960), for example, outlined the contribution of learning theory to such development.

As in the United States, the study of anxiety in relation to school learning has been extensive. Five investigations of considerable interest consisted of

two by Lunzer (1960a, b), who in each study, respectively, evaluated patterns of behavior and the extent of disparity in attainment by aggressive and by withdrawing children; of two, one by Lynn (1957) and one by Lynn and Gordon (1961), who also studied disparity in attainment in relation to temperament; and of one by Veness (1960), who related patterns of goal-setting to grouping of students by ability level.

Studies of attitudes toward, and interests in, school activities were diversified in scope. For example, Gallagher (1956) investigated attitudes toward marriage of students leaving secondary technical and secondary grammar schools, and Carsley (1957) considered the range of reading interests of children aged 10-11.

Conclusion

It seems evident to the writers of this chapter that research in education in the United Kingdom has slowly become more coherent, less dependent upon isolated workers, more interdisciplinary, and more long-term in its objectives than it was during previous years. There is a marked tendency for a few departments of education at universities to concentrate their work for higher degrees around a principal theme or themes in such a way as to develop a significant body of related studies. Outstanding examples of this orientation include the work done on thought processes and on child development at Birmingham; the broadly conceived measurement surveys at Manchester; and the systematic inquiries at Leeds of Piaget's hypotheses.

There is also considerable evidence that educational administrators are recognizing the need for objectively established facts as a check upon opinion in policy-making. At the local level, several individuals in a position of authority have themselves conducted valuable ad hoc field studies. However, one of the results of the sudden recognition at the government level that research facts are essential ingredients in decision-making is a tendency to carry out ad hoc surveys hastily. Such work tends to be wasteful and inefficient in two ways: (a) its retrospective nature tends to yield data that are often incomplete and unreliable, and (b) the approach contributes relatively little to training independent research workers, of whom there is an acute shortage. Less money, intelligently invested in ongoing research units at universities or other institutions that are addressing themselves to major problems, not only would produce more reliable and valid results but also would lend less color to criticisms directed to the ineptness of much research in the social sciences.

Bibliography

- ACE, P. W. "A Remedial Teaching Scheme: Introducing a New Reading Method." *British Journal of Educational Psychology* 26: 191-93; November 1956.
- ALLEN, KEITH R. "Wastage in Technical Education: I. Examination Performance." *Vocational Aspects of Secondary and Further Education* 12: 139-44; Autumn 1960.

- ANNETT, M. "The Classification of Instances of Four Common Class Concepts by Children and Adults." *British Journal of Educational Psychology* 29: 223-36; November 1959.
- BARTLET, D., and SHAPIRO, M. B. "Investigation and Treatment of a Reading Disability in a Dull Child with Severe Psychiatric Disturbances." *British Journal of Educational Psychology* 26: 180-90; November 1956.
- BEARD, R. M. "The Nature and Development of Concepts." *Educational Review* 13: 12-26; 1960.
- CARPENTER, T. E. "A Pilot Study for a Quantitative Investigation of Jean Piaget's Original Work on Concept Formation." *Educational Review* 7: 142-49; 1955.
- CARSLEY, J. D. "The Interests of Children (Aged 10-11) in Books." *British Journal of Educational Psychology* 27: 13-23; February 1957.
- CHAZAN, M. "Maladjusted Children in Grammar Schools." *British Journal of Educational Psychology* 29: 198-206; November 1959.
- CHURCHILL, E. M. "Number Concepts Among Young Children." *Researches and Studies* 17: 34-49; 1958.
- COLLINS, M. "A Follow-Up of Some Former Graduate Student Teachers." *British Journal of Educational Psychology* 29: 187-97; November 1959.
- CURR, W. "Science in the Junior School." *Educational Review* 13: 3-11; 1960.
- DANIELS, J. C. "The Effects of Streaming in the Primary School: I. What Teachers Believe." *British Journal of Educational Psychology* 31: 69-78; February 1961.
- EVANS, K. M. "Is the Concept of 'Interest' of Significance to Success in a Teacher Training Course?" *Educational Review* 9: 205-11; 1957.
- EYSENCK, H. J. "Symposium: The Development of Moral Values in Children: VII. The Contribution of Learning Theory." *British Journal of Educational Psychology* 30: 11-21; February 1960.
- GALLAGHER, M. "The Prospect of Marriage: A Study of Attitudes Towards Further Education of a Sample Group of Secondary Technical and Secondary Grammar School Leavers." *British Journal of Educational Psychology* 17: 24-28; February 1956.
- HEIM, A. W., and WATTS, K. P. "Symposium: Contributions to Intelligence Testing and the Theory of Intelligence: V. An Experiment on Practice, Coaching and Discussion of Errors in Mental Testing." *British Journal of Educational Psychology* 27: 77-88; November 1957.
- HEWITT, E. A. "The Performance in English Language at 'O' Level of a Sample of University Students." *British Journal of Educational Psychology* 30: 40-46; February 1960.
- HOPE, C., and STORER, W. C. "The Arithmetical Attainment of Entrants to Training Colleges." *Educational Review* 9: 113-16; 1957.
- HOPKINS, J.; MALLESON, N.; and SARNOFF, L. "Some Non-Intellectual Correlates of Success and Failure Among University Students." *British Journal of Educational Psychology* 28: 25-36; February 1958.
- KING, W. H. "Studies of Children's Scientific Concepts and Interests: I. The Development of Scientific Concepts in Children." *British Journal of Educational Psychology* 31: 1-20; February 1961.
- LEE, D. M. "Arithmetical Development at the Infant School." *Educational Review* 11: 106-14; 1959.
- LOVELL, K. "A Follow-Up Study of Some Aspects of the Work of Piaget and Inhelder on the Child's Conception of Space." *British Journal of Educational Psychology* 23: 104-17; June 1959.
- LOVELL, K., and WHITE, G. E. "Some Influences Affecting Choice of Subjects in School and Training College." *British Journal of Educational Psychology* 28: 15-24; February 1958.
- LUNZER, E. A. "Intellectual Development in the Play of Young Children." *Educational Review* 11: 205-24; 1959.
- LUNZER, E. A. "Aggressive and Withdrawing Children in the Normal School: I. Patterns of Behaviour." *British Journal of Educational Psychology* 36: 1-10; February 1960. (a)
- LUNZER, E. A. "Aggressive and Withdrawing Children in the Normal School: II. Disparity in Attainment." *British Journal of Educational Psychology* 30: 119-23; June 1960. (b)

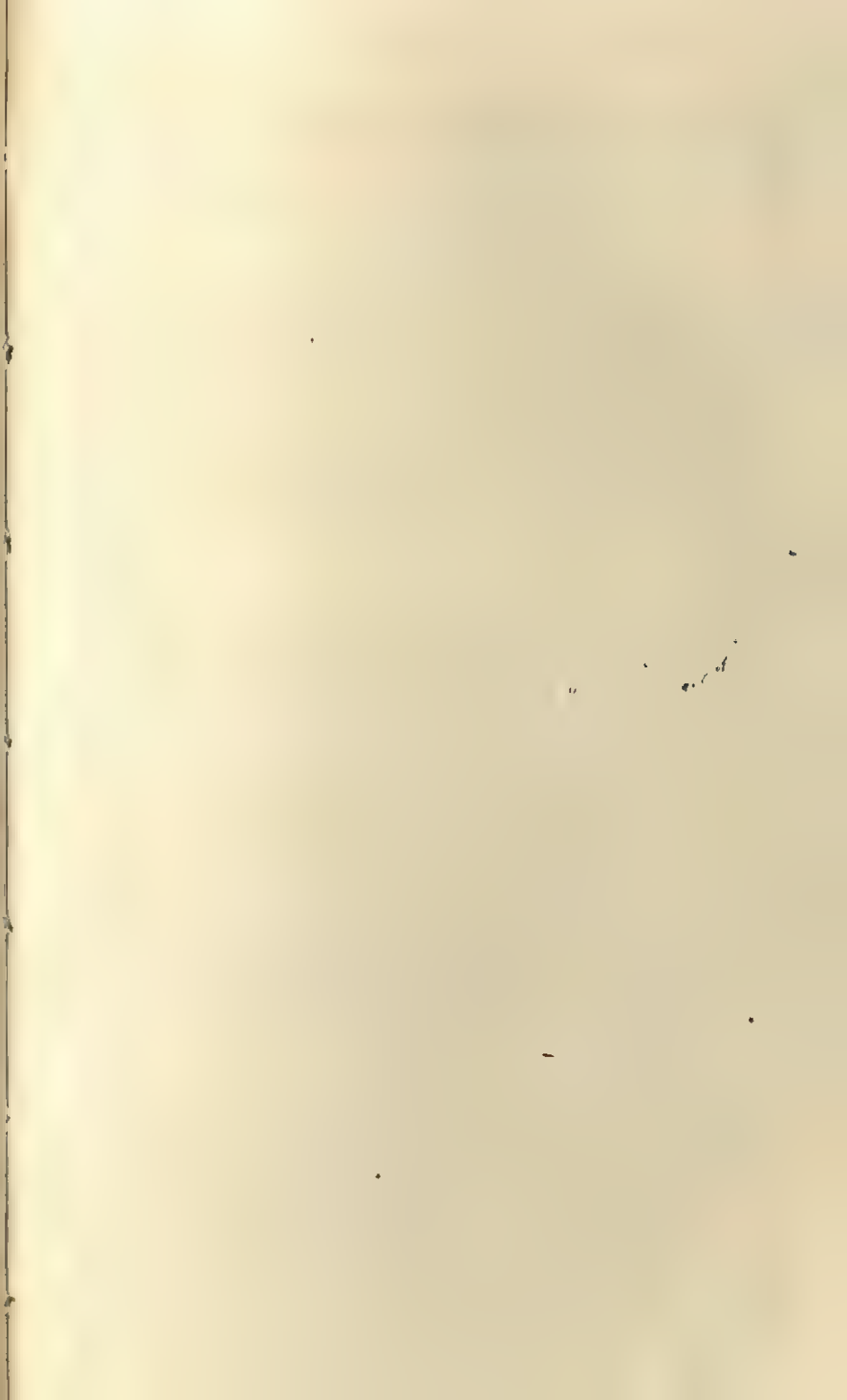
- LYNN, R. "Temperamental Characteristics Related to Disparity of Attainment in Reading and Arithmetic." *British Journal of Educational Psychology* 27: 62-67; February 1957.
- LYNN, R., and GORDON, I. E. "The Relation of Neuroticism and Extraversion to Intelligence and Educational Attainment." *British Journal of Educational Psychology* 31: 194-203; June 1961.
- OLIVER, JAMES N. "An Analysis of the Various Factors Associated with the Assessment of Teaching Ability in Physical Education." *British Journal of Educational Psychology* 26: 66-77; February 1956.
- PEEL, E. A. "Psychology and the Teaching of Science." *British Journal of Educational Psychology* 25: 135-44; November 1955.
- PEEL, E. A. "Experimental Examination of Some of Piaget's Schemata Concerning Children's Perception and Thinking, and a Discussion of Their Educational Significances." *British Journal of Educational Psychology* 29: 89-103; June 1959.
- PHEASANT, J. H. "Studies of Children's Scientific Concepts and Interests: IV. The Influence of the School on the Choice of Science Careers." *British Journal of Educational Psychology* 31: 38-42; February 1961.
- RAVENETTE, A. T. "Vocabulary Level and Reading Attainment: VII. An Empirical Approach to the Assessment of Reading Retardation." *British Journal of Educational Psychology* 31: 96-103; February 1961.
- ROBERTS, G. R. "V. A Study of Motivation in Remedial Reading." *British Journal of Educational Psychology* 20: 176-79; June 1960.
- ROBERTSON, J. D. C. "An Analysis of the Views of Supervisors on the Attributes of Successful Graduate Student Teachers." *British Journal of Educational Psychology* 27: 115-26; June 1957.
- SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION. *Social Implications of the 1947 Scottish Mental Survey*. Publication No. 35. London: University of London Press, 1953.
- SKEMP, R. R. "Reflective Intelligence and Mathematics." *British Journal of Educational Psychology* 31: 45-55; February 1961.
- TRAINING COLLEGE RESEARCH GROUP. "Pre-College Experience and Teaching." *Educational Review* 13: 33-44; 1960.
- VENESS, T. "Goal-Setting Behaviour, Anxiety and School Streaming." *British Journal of Educational Psychology* 30: 22-29; February 1960.
- VERNON, M. D. "The Improvement of Reading." *British Journal of Educational Psychology* 26: 85-93; June 1956.
- WHEELER, D. "Studies of Reasoning in School Children." *British Journal of Statistical Psychology* 11: 137-60; 1958.
- WHEELER, D. "Symposium: The Development of Moral Values in Children: VI. Punishment, Discipline and Educational Objectives." *British Journal of Educational Psychology* 29: 118-27; June 1959.
- ZANGWILL, O. *Cerebral Dominance and Its Relation to Psychological Function*. Edinburgh: Oliver and Boyd, 1960.

Index to Volume XXXII, No. 3

Page citations, though made to single pages, often indicate the beginning of a chapter, section, or running discussion dealing with a topic.

- Administration and/or supervision: Canada, 237; New Zealand, 225; Peru, 257; Spain, 350; United Kingdom, 355; Yugoslavia, 333
- Adolescence: Australia, 221; Japan, 270
- Australia: adolescence, 221; measurement, 222; preschool and primary-level education, 217; reading, 217; school attainment, 218; school subjects, 217; special education, 219; speech, 218; spelling, 218; television, impact of, 222; university students and university problems, 219
- Canada: administration and supervision, 237, 243; curriculum and methods of teaching, 238; educational psychology, 239; measurement, 238; organizations devoted to research, 234; research journals, 236; research methods, 237, 243; research trends, 237; teacher training, 240; utilization of student resources (Atkinson Study), 241
- Chile: articulation and matriculation problems, 251; characteristics and orientation of educational research, 250; education and social change, 252; selection systems for university students, 252
- Curriculum: Canada, 238; East Africa, 295; French-speaking countries, 299; New Zealand, 226; Sweden, 328; United Kingdom, 354; Yugoslavia, 334
- Delinquency: Japan, 269; New Zealand, 228
- East Africa: child development, 294; curricula, 295; educational sociology, 294; language problems, 296; measurement, 294
- Educational psychology: Canada, 239; New Zealand, 228; Spain, 348; United Kingdom, 356; Yugoslavia, 337
- Educational sociology: East Africa, 294; Finland, 323; Israel, 288; New Zealand, 228; Spain, 349
- Finland: child development, 322; differentiation of abilities and attitudes in children, 325; educational attitudes and teachers' roles, 324; main research emphases, 320; measurement, 321; methods of teaching, 322; social psychology and sociology of education, 323
- French-speaking countries (Belgium, France, Switzerland): child growth and development, 303; curriculum and instruction, 299; guidance and testing, 302; teaching materials, production of, 301; teaching personnel, 305
- Israel: child-care services, 281; children from underdeveloped strata in school system, 286; follow-up of graduates, 282; gifted children from underdeveloped strata, 290; intellectual development, 289; school-adjustment problems, 289; socioeducational studies, 289; test development, 281
- Japan: adolescence, 270; developmental studies, 265; group dynamics in classroom, 266; intelligence and intelligence tests, 268; mass media, effect of, 270; parent-child relationships, 272; personality formation, 272; personality tests and projective techniques, 269; problem children and delinquents, 269; special education, 266; teaching-learning process, 271; teaching methods, 265, 271
- Latin American countries: Chile, 250; overview of educational research, 247; Peru, 255; problem areas, 247; Puerto Rico, 261; recommendations, 248
- Measurement and evaluation: Australia, 222; Canada, 238; East Africa, 294; Finland, 321; French-speaking countries, 302; Israel, 281, 282, 289; Japan, 268; New Zealand, 227; Puerto Rico, 262; Yugoslavia, 335
- New Zealand: administration, 225; curriculum, 226; delinquency, 228; educational psychology, 228; educational sociology, 228; history and theory of education, 225; physical development,

- 228; policy, 225; special education, 229; teachers, 230; teaching methods, 229
- Organization devoted to research: Canada, 234
- Peru: intellectual growth, 255; school achievement, 256; school administration, 257; vocational counseling, 259
- Physical development: New Zealand, 228
- Poland: future objectives, 345; recent developments, 344
- Preschool and primary-level education: Australia, 217
- Puerto Rico: measurement of achievement, 262; measurement of personality, 263; trends in recent research, 261
- Research methods: Canada, 237, 243; Yugoslavia, 338
- Scandinavian countries: Finland, 320; Sweden, 327
- School attainment: Australia, 218
- School subjects: Australia, 217; New Zealand, 229; United Kingdom, 354
- Spain: administration, 350; educational psychology, 348; educational sociology, 349; family education, 350; guidance, 350; philosophical and historical literature, 347; teaching methods, 349
- Special education: Australia, 219; Japan, 266; New Zealand, 229
- Sweden: achievement testing and school marks, 329; content of curriculum and methods of instruction, 328; differentiation of pupils, 327; reading, 329; teacher selection and training, 330
- Teacher training: Canada, 240; Sweden, 330; United Kingdom, 355
- Teachers and teaching personnel: Canada, 240; French-speaking countries, 305; New Zealand, 230; Sweden, 230; United Kingdom, 355; Yugoslavia, 338
- Teaching methods: Canada, 238; Finland, 322; Japan, 265, 271; New Zealand, 229; Spain, 349; Sweden, 328; United Kingdom, 354; Yugoslavia, 334
- Television: Australia, 222; Japan, 270
- United Kingdom: abilities and thought processes, 357; cultural and family factors, 356; educational psychology, 356; motivation, 355, 357; personality, 357; school and school-system organization, 355; school subjects, 354; teacher selection and training, psychological variables in, 355; teaching methods, 354
- University problems: Australia, 219
- West Germany: Becker and Teschner Study, 317; 1955 Advisory Memorandum, 314; 1960 Awakening, 315; Post World War II political education, 308; sociological study of Frankfurt students, 312
- Yugoslavia: administration, 333; curriculum and teaching methods, 334; educational psychology, 337; educational sociology, 337; financial resources, 333; measurement, 335; mental and physical development, 338; research methods, 338; teacher personnel, 338





REVIEW OF EDUCATIONAL RESEARCH

*Official Publication of the American Educational Research Association
Contents are listed in the Education Index.*

Copyright 1962

By National Education Association of the United States, Washington, D.C.

Volume XXXII, No. 4

October 1962

Vocational, Technical, and Practical Arts Education

Reviews the literature for the six-year period
since the issuance of Vol. XXVI, No. 4, October 1956

TABLE OF CONTENTS

<i>Chapter</i>	<i>Page</i>
Foreword	365
I. Vocational, Technical, and Practical Arts Education.....	367
RALPH C. WENRICH, <i>University of Michigan, Ann Arbor, Michigan</i>	
GORDON I. SWANSON, <i>University of Minnesota, Minneapolis, Minnesota</i>	
RUPERT N. EVANS, <i>University of Illinois, Urbana, Illinois</i>	
II. Career Planning, Job Placement, and Follow-Up.....	377
JOHN L. FERGUSON, <i>University of Missouri, Columbia, Missouri</i>	
FRANK G. DICKEY, <i>University of Missouri, Columbia, Missouri</i>	
III. Agricultural Education.....	384
LLOYD J. PHIPPS, <i>University of Illinois, Urbana, Illinois</i>	
IV. Home Economics Education.....	393
JUNE COZINE, <i>Oklahoma State University, Stillwater, Oklahoma</i>	
V. Industrial Education.....	402
JOHN W. KARNES, JR., <i>University of Connecticut, Storrs, Connecticut</i>	
VI. Business Education.....	411
RAY G. PRICE, <i>University of Minnesota, Minneapolis, Minnesota</i>	
VII. Distributive Education.....	418
HARLAND E. SAMSON, <i>State College of Iowa, Cedar Falls, Iowa</i>	
VIII. Technical Education.....	423
M. RAY KARNES, <i>University of Illinois, Urbana, Illinois</i>	
Index	433
	368

This issue of the REVIEW was prepared by the
Committee on Vocational, Technical, and Practical Arts Education

RUPERT N. EVANS, *Chairman*, University of Illinois, Urbana, Illinois
JUNE COZINE, Oklahoma State University, Stillwater, Oklahoma
JOHN L. FERGUSON, University of Missouri, Columbia, Missouri
JOHN W. KARNES, JR., University of Connecticut, Storrs, Connecticut
GORDON I. SWANSON, University of Minnesota, Minneapolis, Minnesota
LAWRENCE S. WRIGHT, State College of Iowa, Cedar Falls, Iowa

with the assistance of

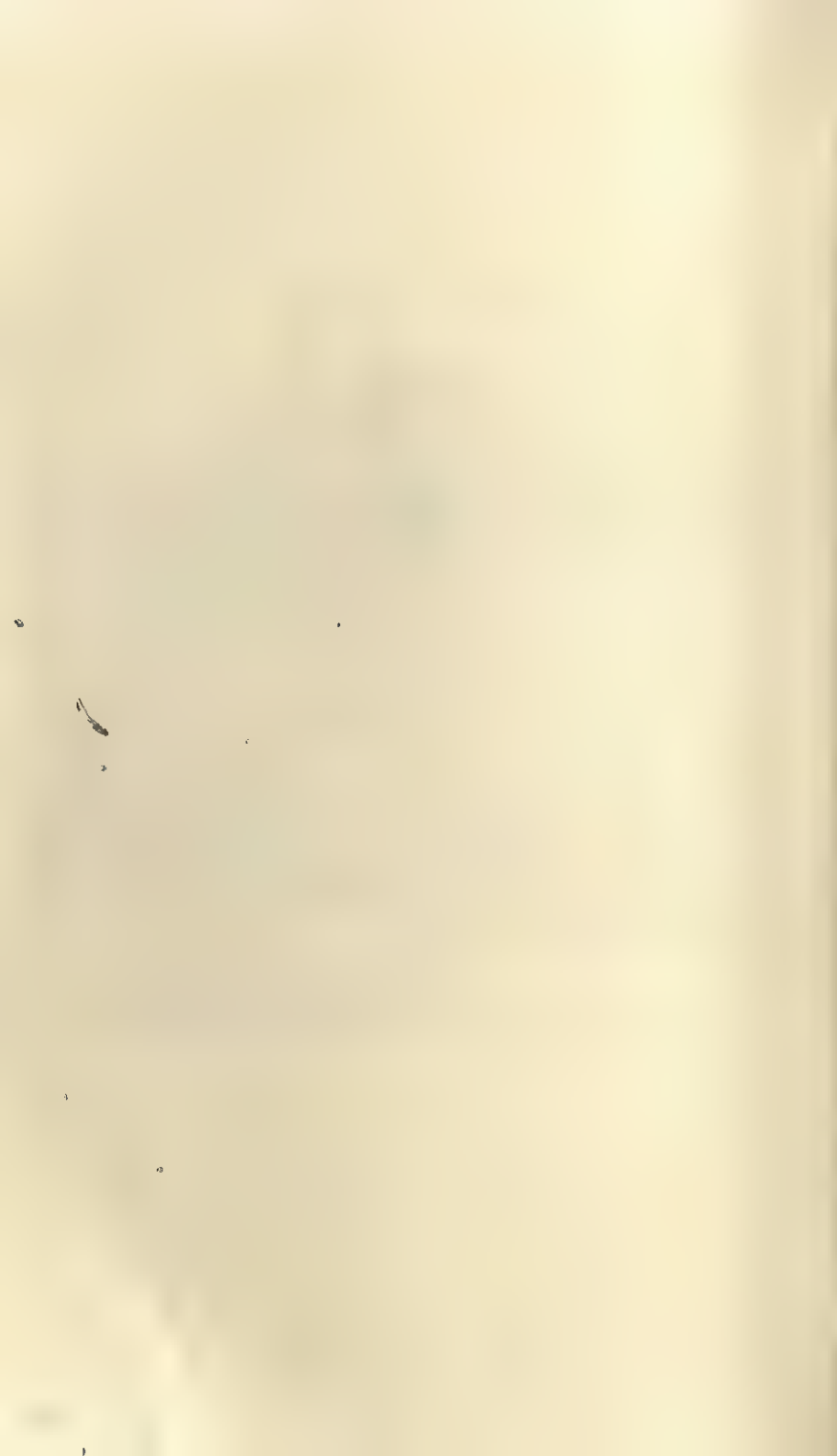
FRANK G. DICKEY, University of Missouri, Columbia, Missouri
M. RAY KARNES, University of Illinois, Urbana, Illinois
LLOYD J. PHIPPS, University of Illinois, Urbana, Illinois
RAY G. PRICE, University of Minnesota, Minneapolis, Minnesota
HARLAND E. SAMSON, State College of Iowa, Cedar Falls, Iowa
RALPH C. WENRICH, University of Michigan, Ann Arbor, Michigan

FOREWORD

This issue of the REVIEW is similar in organization to the June 1947, October 1950, and October 1956 issues. Minor changes include addition of a chapter on distributive education (which had been included as only a small part of the chapter on business education in the October 1956 issue) and deletion of the chapter on work experience (here considered within other chapters). Slight changes have been made in the issue title and in some chapter titles to conform with current usage. The only major change is the addition of an initial chapter which reviews research involving two or more of the subject matter areas in this field. The present tendency toward breaking down the traditional walls between these areas shows itself in the increased number of studies which properly fit in such a chapter.

Passage of the Manpower Development and Training Act, which has funds set aside for research, and an increased receptivity to research on the part of teachers and administrators in vocational education and in the practical arts seem to assure that the next six years will see an even greater increase in research quantity and quality than was evident during the past six years. Certainly there will be a marked increase in the number and complexity of problems needing study.

RUPERT N. EVANS, *Chairman*
Committee on Vocational, Technical,
and Practical Arts Education



CHAPTER I

Vocational, Technical, and Practical Arts Education

RALPH C. WENRICH, GORDON I. SWANSON, and RUPERT N. EVANS

SUBSEQUENT chapters of this issue of the REVIEW deal with research in each of the major fields of vocational, technical, and practical arts education. This chapter will be limited to (a) a discussion of the current status of research in vocational education and the practical arts and (b) a review of significant research which cuts across or is relevant to two or more of the several major fields.

Current Status of Research

A study of this issue of the REVIEW leads one rapidly to the conclusion that research in this field is highly compartmentalized, with little extension beyond the subject matter area for which it was planned.

As several of the chapter authors point out, many of the studies reported have been done by students as a part of their degree work. Almost all of the remainder has come from staff members who must first have been subject matter teachers; secondly, professional educators or administrators in a subject matter field; and only thirdly, researchers. It is little wonder that since many people are not occupied primarily in research, the work which is done tends to be subject matter oriented. This problem is accentuated for individuals who are concerned with financial support for research in vocational education, since most states require researchers to have had experience in certain specified occupations before they are eligible to use state and federal vocational funds. Due in part to such restrictions, a very small proportion of the funds set aside for operation of vocational education programs is used for research.

In this chapter, a few studies by industrial sociologists are included. Although men in this field are rarely concerned directly with education, they are aware of its importance to industry and society. Industrial psychologists, however, often work with specific problems which seem to have little general applicability; and those who work with the military suffer an additional handicap, for their results are often published in papers not generally available to other researchers. It would appear that most of the researchers quoted in this issue know little of military studies. This is unfortunate, for the military has done far more research on pertinent problems in vocational, technical, and practical arts education than have civilian agencies.

It is only fair, of course, to point out that industrial sociologists and psychologists seem to be little aware of work done by vocational and practical arts researchers. The article by Gagne (1962), for example, shows no awareness of the literature on occupational analysis. Research being done in Europe indicates a much closer relationship between vocational educators and academic researchers than that which exists in this country.

The two glaring deficiencies in this research field are the inadequate treatment of principles of curricular experimentation and of principles of teaching and learning. Although mentioned in some of the subject matter chapters, these problem areas do not receive the attention they deserve in this volume.

Most of the research directly related to vocational education and to the practical arts has been descriptive in nature, although it is encouraging to note that a few experimental studies have been completed during the period covered by this REVIEW. It should also be pointed out that most of the research which cuts across two or more of the major fields deals with vocational education. Although much research has been done in the practical arts, studies are almost invariably limited to one of the practical arts. A bibliography on vocational education prepared by Wenrich (1960) will be found in the *Encyclopedia of Educational Research*.

Terminology

Lack of agreement on definitions of terms has been an obstacle to research in vocational education and the practical arts. Byram and Wenrich (1956) and Roberts (1957) have contributed to the standardization of terms and to the clarification of the concepts dealing with, and the relationships between, vocational education and the practical arts.

Sociology and Psychology of Work

Since vocational education is education for work—any kind of work which the individual finds congenial and for which society has need—research dealing with the sociological and psychological implications of work is relevant. Nosow and Form (1962) have compiled a comprehensive collection of readings in the sociology of work, and Gross (1958) has written an interesting volume on work organizations, including farms, restaurants, and factories.

Studies by psychologists provide new insights concerning motivation. From a study of 200 accountants and engineers, Herzberg, Mausner, and Snyderman (1959) concluded that the most profound motivation to work comes from the recognition of individual achievement and from the sense of personal growth in responsibility.

Manpower and Education

Society's Need for Manpower

Although work is essential in the life of the individual, it is also necessary for the economic well-being of society. The U.S. Department of Labor gathers statistics and publishes reports such as the three cited in Chapter VIII of this issue—reports that describe the current manpower situation and future needs. The National Manpower Council (1957, 1960) has published two studies which serve to advise the nation on ways in which individual abilities can best be developed and utilized. Although no specific reports will be cited, it should be mentioned that a number of states have done studies of their manpower needs and have made proposals for vocational and technical education.

Society's need for manpower is affected by technological development in business, industry, agriculture, and the home. Through the evaluation of statistics of occupational distribution and through use of detailed case studies of particular establishments, Wolfbein (1962) found that automation has contributed to an acceleration of the long-term growth of the generally higher skilled, white collar, service-oriented activities.

For purposes of planning local programs of vocational education, more specific information is needed in regard to the kind and character of manpower needs of the community or area served by a particular school or school district. Surveys to determine local manpower needs have been done in many places. As Evans (1962) has pointed out, local community surveys are considerably more valuable for public relations purposes than for educational planning. Techniques used in these studies have changed little since the 1920's.

Manpower Needs and the Schools

Another type of study is that in which manpower needs are considered in relation to what the schools can and should do about them. Thomas (1956) examined the character of the occupational distribution of the labor force and then related his study to functions which the schools should perform in a broadly conceived program of vocational education.

Recognizing the lack of vocational education in many rural schools as "the most severe educational shortcoming," the National Education Association, Department of Rural Education (1959), in a yearbook devoted to the subject of vocational education, reviewed some of the problems of providing an adequate program of vocational education in rural schools and made suggestions which will enable such schools to provide instruction to prepare each individual for performance in a chosen vocation. A special staff committee of the Detroit Public Schools (1962) outlined for their board of education a series of recommendations concerned primarily with the education of employment-bound youth in the secondary schools.

From his study of American high schools, Conant (1960) made the following conclusions: (a) The vocational program at the high school level should be related to employment opportunities in the general locality. (b) Practical courses of a relatively simple type for those students reading two or three grades below their level might be included in the vocational programs. Conant considered that closer cooperation between leaders of vocational education and others concerned with practical courses in high school is desirable. Hand (1960) made a study to determine the extent to which the vocational education needs of high school youth in Illinois are being met. He found that only one out of five non-Chicago high schools offers the requisite amount of work in vocational-industrial education and only one out of three provides appropriate programs to prepare youth for occupations in business. In the case of agriculture and home economics, Hand found the situation somewhat better.

History of Vocational Education

³ Mobley (1956) devoted an issue of the *American Vocational Journal* to 50 years of progress in vocational and practical arts education. In a bulletin describing the Soviet program of education, Medlin, Lindquist, and Schmitt (1960) outlined in detail the development of polytechnical education in Russia's general schools.

Administration of Vocational Education

Two yearbooks of the American Association of School Administrators (1958, 1959) should be of special interest to those responsible for the organization and administration of vocational education programs. The 1959 yearbook, *Educational Administration in a Changing Community*, summarizes the research dealing with the structure of communities and gives techniques for studying the community in order to obtain the information necessary to plan and to operate educational programs.

Organization

Although the entire yearbook of the American Association of School Administrators (1958), entitled *The High School in a Changing World*, has implications for vocational education, the chapter dealing with the organization of the secondary school is particularly relevant. The authors suggested that the faculty organization of the secondary school should be so constituted that the basis of departmentalization is consistent with the school's stated purposes and functions rather than with the subject areas alone. The American Vocational Association, Research and Publications Committee (1959) recommended the development of area vocational

school programs through the reorganization of the schools in larger and more effective units of administration. In a survey of state directors of vocational education in the United States, Harrington (1957) noted that although vocational programs were being developed in diverse patterns, there was a light trend toward the area, or regional, type of school.

Financing Vocational Education

The U.S. Department of Health, Education, and Welfare, Office of Education (1960) published a report which included a financial summary of federal, state, and local annual expenditures for programs operated under the provision of the federal vocational education acts. The report also included enrollment statistics and other descriptive program information.

Wenrich (1962b) did a study to determine more effective ways of using state and federal vocational education funds in the further development of vocational teacher education in Michigan. He concluded that certain services would be provided, whether or not institutions in teacher education are reimbursed, and he recommended that funds for vocational teacher education be used only to promote those essential services that would not be provided adequately without reimbursement. Research and experimentation were included in this category. Wenrich (1962a) did a similar study dealing with the use of state and federal funds in the promotion and further development of local programs. He recommended that payment by the federal and state agencies of the salaries of teachers in high school programs be withdrawn after five years and that funds be used to promote new programs and supporting services.

Evaluation

The U.S. Department of Health, Education, and Welfare, Office of Education (1961) has defined national needs and objectives which can be used as guidelines in evaluating state or local programs of vocational education.

Skill Development

Research in skill development is pertinent to problems of teaching and learning in many areas of vocational and technical education. Stolurow (1961) evolved six basic principles for skill teaching. Gagne (1962) questioned the practical utility of the principles of learning that are developed in academic laboratories. He suggested that task analysis, component task achievement, intratask transfer, and sequence of subtask learning are vital to effective training. Ammons and Ammons (1960) prepared a brief but informative summary of research on skill development.

International Studies

The United Nations Educational, Scientific, and Cultural Organization's (UNESCO) (1962) first set of recommendations dealing with education at an international level pertained to technical and vocational education. The draft recommendation, which was preceded by a preliminary international study, was sent to each of the member states, together with a questionnaire inviting comments on each section of the proposed recommendation. An analysis of all replies and an analysis of the full text to which the replies pertained were published along with the revised recommendation.

UNESCO's recommendation covers technical and vocational education in the fields of industry, agriculture, and commerce. It was intended to deal with all levels at which such education is provided, both in advanced countries and in those in which systems of technical and vocational education are being created or expanded. Its coverage is detailed. After further consideration and acceptance by the Twelfth General Conference of UNESCO, it will be submitted to each of the member states for ratification. The recommendation is likely to exert more international influence, particularly in economically underdeveloped countries, than any previous work in the field.

The International Labor Organization (ILO) (1962) has prepared an international recommendation on vocational training. This recommendation was prepared by updating the previously effective 1939 recommendation on vocational training and by analyzing replies from member states concerning the new recommendation. The ILO recommendation is applicable to all training designed to prepare any person for initial or later employment or for promotion in any branch of economic activity, including general, vocational, and technical education. However, it neither includes training above the level of foreman in industry nor applies to training in agriculture or seafaring.

The ILO recommendation is very general and inclusive. Like the UNESCO recommendation, it will be submitted first to its own governing body at its Forty-Sixth Session and then to member states for ratification. Along with UNESCO's recommendation, it will be most important in establishing normative patterns for vocational training.

De Coster (1959) provided an extensive review of conclusions drawn by an international study group meeting in Brussels. The study group convened to examine relevant premises for developing internationally applicable principles of vocational and technical education. Major conclusions dealt with the role of general education in vocational education, the administrative structure of vocational education, teacher training, the desirable level and degree of vocational and technical education, and the importance of vocational and technical training for women.

Swanson (1961) described the special problems of agricultural education in underdeveloped countries. In an analysis based on multilateral

and regional agency recommendations, he highlighted the problems of the acceptance of an investment role for agricultural education, the necessary adjustments to successive stages of economic growth, the special characteristics of change in farming methods, the need to unify programs and purposes of agricultural education and extension, and the special need for agricultural education for women. Most of the principles stated apply to all vocational education.

Investment and Economic Development Role of Vocational and Technical Education

Few studies have dealt exclusively with the investment and economic development role of vocational and technical education, but most of the general inquiries in the field have accorded a vital role to vocational and technical education.

From his examination of the demand for education in underdeveloped regions, Bos (1961) has concluded that the increase of enrollment ratios for vocational education will exceed that for general education. During the period 1958-70, the estimated increases in enrollment ratio in vocational education for Africa, Asia, and Latin America are 100 percent, 100 percent, and 27 percent, respectively.

Vaizey (1961) has supported the conclusion that technical education must have a high priority and has further emphasized that the separation of technical education into specialized technical institutions has more obvious disadvantages than advantages. As a supply function in educational investment, the difficulties of developing technical education, although concerned with factors of social acceptance and of educational structure, are partly social and partly concerned with educational structure, but are mainly due to the shortage of qualified teachers.

Wolfe (1962) has compared countries having centrally planned economies with those having decentralized planning of skilled manpower needs. He has shown how educational authorities outside countries with centrally planned economies have avoided any precise matching of educational output with expected manpower demands, while at the same time attempting to create the conditions allowing such alignments to be made more closely. In agreement with Vaizey (1961), Wolfe has concluded that the shortage of technical education may be due to a social structure that does not offer adequate reward for such training.

Platt (1961) has established a step-by-step process for educational programming of manpower requirements of economic development. He has given specific attention to time requirements and especially to the leadtime necessary for certain types of training. Vocational training and retraining were emphasized, as was the necessity for teacher training, a need that Platt compared to the creation of producers' goods in industry.

Svennilson, Edding, and Elvin (1961) have conducted one of the most extensive studies in the field. It was completed under the auspices of the Organization for Economic Cooperation and Development. They have noted the breakdown of traditional apprenticeship systems as educational and training schemes. Their recommended alternative was to lengthen the period of compulsory education, with the addition of vocational education for the majority of students. Their analysis included detailed enrollment, expenditure, and gross national product determinations for all of Europe and North America.

Vaizey's (1962) review of available literature also constituted an analysis of the various issues affecting the investment role of education. In the section on manpower, he concluded that the labor market generally indicates the short-run interests of those who make wage bargains, rather than the long-run interests of the economy. In addition, he suggested that long-run forecasts need to estimate the direction and pace of technological change together with a simultaneous estimate of how changes in knowledge itself will alter the future. Included in this analysis was a comparative examination of the United States, the United Kingdom, and the Soviet Union.

Harbison (1961) described the process of manpower analysis and established the components of a strategy of development of human resources. His strategy was mainly applicable to economies not centrally controlled. His analysis, which showed how a prevailing salary structure may be more related to social structure than to economic need, seemed to illustrate how skilled people may not be regarded at their scarcity value and how skills may therefore be underutilized in developmental efforts.

Bibliography

- AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *The High School in a Changing World*. Thirty-Sixth Yearbook. Washington, D.C.: the Association, a department of the National Education Association, 1958. 383 pp.
- AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *Educational Administration in a Changing Community*. Thirty-Seventh Yearbook. Washington, D.C.: the Association, a department of the National Education Association, 1959. 221 pp.
- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH AND PUBLICATIONS COMMITTEE. *Area Vocational Education Programs*. Washington, D.C.: the Association, 1959. 40 pp.
- AMMONS, R. B., and AMMONS, C. H. "Skills." *Encyclopedia of Educational Research*. Revised edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. pp. 1282-87.
- BOS, H. C. *The Global Demand for Higher and Secondary Education in the Underdeveloped Countries in the Next Decade*. Policy Conference on Economic Growth and Investment in Education. Paris: Organization for Economic Cooperation and Development, 1961. 16 pp.
- BYRAM, HAROLD M., and WENRICH, RALPH C. *Vocational Education and Practical Arts in the Community School*. New York: Macmillan Co., 1956. 512 pp.
- CONANT, JAMES B. "Vocational Education and the National Need." *American Vocational Journal* 35: 15-19; January 1960.

- DE COSTER, S. *De la formation professionnelle et technique de la jeunesse*. Rapport de la commission d'experts de l'enseignement technique et professionnel tenue à Bruxelles. Brussels: Ministère de l'instruction publique et commission nationale Belge de l'UNESCO, 1959. 237 pp.
- DETROIT PUBLIC SCHOOLS. *Preparing Pupils for the World of Work*. Detroit: Board of Education, 1962. 72 pp.
- EVANS, RUPERT N. "Industry and the Content of Industrial Education." *School Shop* 21: 29-31, 110; April 1962.
- GAGNE, ROBERT M. "Military Training and Principles of Learning." *American Psychologist* 17: 83-91; February 1962.
- GROSS, EDWARD. *Work and Society*. New York: Thomas Y. Crowell Co., 1958. 652 pp.
- HAND, HAROLD C. "Illinois' Needs and the Coolie Philosophy." *American Vocational Journal* 35: 9-11; December 1960.
- HARBISON, FREDERICH. *The Strategy of Human Resource Development in Modernizing Economics*. Policy Conference on Economic Growth and Investment in Education. Paris: Organization for Economic Cooperation and Development, 1961. 33 pp.
- HARRINGTON, GORDON M. "Vocational Education Moving in Diverse Directions." *Nation's Schools* 60: 45-48; July 1957.
- HERZBERG, FREDERICK; MAUSNER, BERNARD; and SNYDERMAN, BARBARA. *The Motivation To Work*. New York: John Wiley & Sons, 1959. 157 pp.
- INTERNATIONAL LABOR ORGANIZATION. *Proposed Recommendation Concerning Vocational Training*. Report IV (2). International Labor Conference, Forty-Sixth Session. Geneva: the Organization, 1962. 101 pp.
- MEDLIN, WILLIAM K.; LINDQUIST, CLARENCE B.; and SCHMITT, MARSHALL L. "Polytechnical Education in the General Schools." *Soviet Education Program*. U.S. Department of Health, Education, and Welfare, Office of Education, Bulletin 1960, No. 17. Washington, D.C.: Government Printing Office, 1960. Chapter 3, pp. 94-171.
- MOBLEY, M. D., editor. "Fifty Years of Progress in Vocational and Practical Arts Education." *American Vocational Journal* 31: 1-120; December 1956.
- NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF RURAL EDUCATION. *Vocational Education for Rural America*. (Edited by Gordon I. Swanson.) 1958-59. Yearbook. Washington, D.C.: the Department, 1959. 354 pp.
- NATIONAL MANPOWER COUNCIL. *Womanpower*. New York: Columbia University Press, 1957. 371 pp.
- NATIONAL MANPOWER COUNCIL. *Education and Manpower*. (Edited by Henry David.) New York: Columbia University Press, 1960. 326 pp.
- NOSOW, SIGMUND, and FORM, WILLIAM H. *Man, Work, and Society*. New York: Basic Books, 1962. 612 pp.
- PLATT, WILLIAM J. *Toward Strategies of Education*. Menlo Park, Calif.: Stanford Research Institute, 1961. 37 pp.
- ROBERTS, ROY W. *Vocational and Practical Arts Education*. New York: Harper & Brothers, 1957. 637 pp.
- STOLUROW, LAWRENCE M. "Learning Manual Skills." *Journal of Dental Education* 25: 308-17; December 1961.
- SVENNILSON, INCVAR; EDDING, FRIEDRICH; and ELVIN, LIONEL. *Targets for Education in Europe—A Study of Policy Considerations Related to Economic Growth*. Policy Conference on Economic Growth and Investment in Education. Paris: Organization for Economic Cooperation and Development, 1961. 120 pp.
- SWANSON, GORDON I. "Remarques sur la formation professionnelle agricole dans les pays en voie de développement économique." *Revue fatis* 8: 140-44; 1961.
- THOMAS, LAWRENCE G. *The Occupational Structure and Education*. Englewood Cliffs, N.J.: Prentice-Hall, 1956. 502 pp.
- UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANIZATION. *Preliminary Draft Recommendation Concerning Technical and Vocational Education*. (Annex I to the final report by the director-general, prepared in accordance with the provisions of Article 10.3 to the Rules of Procedure Concerning Recommendations to Member States and International Conventions covered by the terms of Article IV, Paragraph 4, of the Constitution.) Paris: the Organization, 1962. 17 pp.
- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION. *Digest of Annual Reports of State Boards for Vocational Education to the Office of Education, Division of Vocational Education*. Washington, D.C.: Government Printing Office, 1960. 69 pp.

- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION. *Vocational Education in the Next Decade*. Washington, D.C.: Government Printing Office, 1961. 197 pp.
- VAIZEY, JOHN. *Some of the Main Issues That Must Be Faced in the Strategy of Educational Supply*. Policy Conference on Economic Growth and Investment in Education. Paris: Organization for Economic Cooperation and Development, 1961. 25 pp.
- VAIZEY, JOHN. *The Economics of Education*. London: Faber & Faber, 1962. 165 pp.
- WENRICH, RALPH C. "Vocational Education." *Encyclopedia of Educational Research*. Revised edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. pp. 1555-64.
- WENRICH, RALPH C. *A Study To Determine More Effective Ways of Using State and Federal Vocational Education Funds in the Further Development of Programs Operated by Local School Districts*. Staff study. Ann Arbor: University of Michigan, 1962. 88 pp. (a)
- WENRICH, RALPH C. *A Study To Determine More Effective Ways of Using State and Federal Vocational Education Funds in the Further Development of Vocational Teacher Education in Michigan*. Staff study. Ann Arbor: University of Michigan, 1962. 36 pp. (b)
- WOLFBEIN, SEYMOUR L. "Automation and Skill." *Annals of the American Academy of Political and Social Science* 340: 53-59; March 1962.
- WOLFE, MARSHALL. *Planning of Education in Relation to Socio-Economic Development*. Conference on Education and Economic and Social Development in Latin America. Santiago, Chile: United Nations Educational, Scientific, and Cultural Organization, Organization of American States, and United Nations Economic Commission for Latin America, 1962. 17 pp.

CHAPTER II

Career Planning, Job Placement, and Follow-Up

JOHN L. FERGUSON and FRANK G. DICKEY

RESEARCH of the past six years has pointed to an emerging trend toward the development of a more inclusive theory of vocational development. Borow (1961) has outlined some of the distinguishing characteristics of this new approach to vocational or career development as the attempt at explanatory principles wherein choices are the result of individual needs, roles, and models. Long-term vocational behaviors are seen to occur within an ordered sequence of life stages in which choices are lawful and predictable. While this newer approach offers much for the future, the problems are many and formidable. With the increased emphasis now being placed on vocational counseling at the secondary school level, it is unlikely that a major decrease in the number of studies relating to trait theory and vocational choice or occupational success will take place in the immediate future. As a consequence of the general research activity, the rest of this chapter will be divided into sections related to general theory of vocational development, general education, and specific occupational programs.

General Theory of Vocational Development

Principal research activity in the newer career development studies resides in the 20-year longitudinal Career Pattern Study, under the direction of Super, and in the Harvard Studies in Career Development, directed by Tiedeman and a number of researchers who have attempted to test certain hypotheses related to general vocational development. There are now two published monographs relating to the Career Pattern Study. The first of these, by Super and others (1957), described the initial planning and procedures to be employed, and the second, by Super and Overstreet (1960), reported findings concerning the vocational interests of ninth-grade boys. Possibly the most important achievement has been the development of usable indexes of vocational maturity.

Tiedeman's (1961) most recent contribution was a research model, a paradigm or "set" of the processes of vocational decision. First, Tiedeman suggested the vocational development stage of anticipation with substages of exploration, crystallization, choice, and specification; second, he proposed the stage of implementation and adjustment with substages of induction, transition, and maintenance. In addition, he pointed to the work history of the individual as the criterion. For a more extensive

review of theory and research in career development, one should consult the paper by Borow (1960).

Two studies by Schutz and Blocher (1960, 1961) have attempted to test hypotheses related to vocational theory. The first was derived from Bordin's theory that there should be a relationship between the individual's self-concept and his stereotype of various occupations. The second study served to test Holland's theory of a relationship between a measure of self-satisfaction and one's position on the occupational level scale of the *Strong Vocational Interest Blank (SVIB)*. The authors concluded that there was modest support for each theory.

Investigating occupational stereotypes as perceived in terms of manifest needs by high school students, Dipboye and Anderson (1961) found that students do associate certain needs with selected occupational groups. Gonyea (1961) considered that an occupational dimension based upon individual job perception would be more meaningful than previously proposed systems. He employed factor-analytic techniques to group occupations in terms of students' perceptions of their similarities and obtained results which suggested a different grouping from that furnished by conventional job classifications.

Segal (1961) concluded that psychoanalytic theory can be utilized to predict personality differences between accountants and creative writers. Nachmann (1960) tested hypotheses which would be required by psychoanalytic theory to account for adult job behavior as developed from early childhood background and obtained results which supported her general hypothesis. However, Hagen's (1960) investigation did not clearly indicate the influence of childhood forces on careers.

Crites (1960) found support for the hypothesis that greater ego-strength is associated with increased focusing of interest in specific areas. Stephenson (1961) indicated that for premedical students, the self-concept of the student had crystallized prior to making application to a school of medicine.

Two studies were concerned with the ranking by high school students of occupations in terms of such characteristics as security, prestige, interest of work, educational advancement, and altruism. Steffire (1959) found that either the students could not differentiate between the various factors or that all were important in the status associated with an occupation. Dipboye and Anderson (1959) obtained comparable rankings of occupational factors for boys and girls in grades 9 and 10.

Additional References: Merwin and DiVesta (1959); O'Hara and Tiedeman (1959); Tyler (1961).

General Education

The idea of vocational and educational persistence has been the subject of much research during the time covered by this REVIEW. There seems to have been a *de facto* assumption that persistence is a good thing.

Rothney (1958) reported an extensive study of a group of counseled and noncounseled high school students. Through an unusually persistent follow-up technique, he was able to secure a 100-percent return five years after graduation. He concluded that "variability, rather than persistence, is the rule" with regard to carrying out high school plans. His counseled subjects did show a significant trend in the direction of persistence over the control group. From Rothney's study, it would appear that counseling is effective, but not as effective as many counselors claim.

Forrest (1961) studied the vocational plans of 507 Merit scholars. Almost one-half of this group changed their vocational choice between the senior year of high school and the junior year of college. Vocational choice appeared to be easier to change than major field of study. The observed changes were in the direction from science to nonscience majors and from practical to theoretical.

Holden (1961) found support for the hypothesis that stability of vocational choice from grade 8 to grade 11 is higher for students of high ability than for students of lower ability.

Andrew and Stroup (1960) obtained responses from 12,746 Arkansas high school seniors concerning future plans. They found that 41 percent of the group indicated a desire for college. Of the college-bound group, 38 percent scored below the national median on a widely used scholastic aptitude test. Those boys who did not anticipate college expressed a preference for military service and for the skilled trades. Girls who were not bound for college preferred business school or clerical jobs.

Lockwood (1958) studied the relationship of high school students' race, sex, address, school, intelligence, occupation of parents, and number of siblings with respect to realism of vocational choice when each of the above factors (except intelligence) was removed from personal data in assessing the students' personal fitness to be successful in their job-preference demands. He concluded that 95 percent of the 507 subjects were judged to be realistic in their preferences, including the 37 percent of his sample who might be expected to compete successfully at a higher level. This reviewer would interject a question concerning Lockwood's procedures: Does one really operate entirely independently of social forces and economic conditions? It must appear that race and socioeconomic background still impose limits for individual attainment.

Additional References: Thorndike and Hagen (1959); Wolfbein (1959).

Specific Occupational Programs

The published research activity related to specific occupational groups does not appear to show much increase in the number of occupations studied, but rather seems to express a refinement in techniques or variables investigated. While an attempt was made to sample from the published research, it is recognized that the results of many local research projects

never have widespread distribution. This is probably particularly true with the increased emphasis now being placed on state and national testing programs and on their use for selection and placement purposes.

Agricultural students and workers in the outdoors were the subject of at least three studies. Brayfield and Marsh (1957) studied the characteristics of a group of farmers with respect to abilities, interests, personality, job performance, and job satisfaction. They were found on the average to score low on mental ability, but within a wide range, and ranked high both on the outdoor scale of the *Kuder Preference Record* and on the mechanical reasoning scale of the *Differential Aptitude Tests*. No relationships were found between personality variables and performance, satisfaction, and aptitude, or between performance and satisfaction. Numerical ability and scientific interests were significantly related to job performance. Brody (1957) found that foresters had higher outdoor, mechanical, and scientific interests than other men, although an earlier study by Bourdo (1954) concluded that a higher outdoor interest gave no assurance that a person is adjusted to, or can adjust to, forestry either in school or in later life.

Using the *Kuder Preference Record* and the Allport-Vernon-Lindzey *Study of Values*, Guba and Getzels (1956) failed to find differentiated patterns for flying and nonflying Air Force officers, although some differences were observed in contrast to men in general. Dunnette (1957) found that it was possible to develop keys on the *SVIB* which would differentiate between four groups of engineers—those in pure research, those in applied research, those in process and production, and those in technical service. McCornack (1956) noted that *SVIB* keys could be developed for men and women social workers. Witkin (1956) studied the vocational interest patterns of three types of salesmen: namely, those in a specialty, those in a route assignment, and those in sales engineering. He concluded that while they may share certain interest factors, there are also differentiating aspects of their patterns.

Hewer (1956) administered an extensive battery of tests to medical students and found certain distinguishing characteristics of successful and unsuccessful students, although experienced counselors were unable to differentiate the groups in terms of profiles on the *SVIB* and the *Minnesota Multiphasic Personality Inventory*. Beaver (1956) found that she was unable to distinguish significantly between successful and unsuccessful student nurses on the *Kuder Preference Record*, although Kline and Cumings (1956) described characteristic vocational interest patterns of public-health nurses, as contrasted with women in allied health fields.

The general findings of many studies seem to support a conclusion that while variables—usually interests, aptitudes, and some personality characteristics—may be found that successfully differentiate occupational groups, these variables are not correlated highly with success in training for a specific job or with success on the job. In general, the predictive

studies do somewhat better at predicting success in training than at predicting success on the job.

A few additional studies appear to be noteworthy. Long (1959) reported the use of multiple-regression techniques to predict the training success of high school students in five technical and vocational programs with multiple-correlation coefficients ranging for boys and girls from .33 to .60. Samuelson (1958) found that three of the *Kuder Preference Record* scales differentiated training success of trade school students, although the forecasting efficiency of the best predictor was only about 9 percent. Patterson (1956) found that a group of students enrolled in a bakers training course tended to have *Kuder Preference Record* peaks at the seventy-fifth percentile on the artistic scale and at the sixty-fifth percentile on the musical scale. Since the students had above-average ability scores, one wonders whether a counselor might not suggest a fine arts curriculum for such students.

Lewis and MacKinney (1961) requested that six experienced college counselors predict the job satisfaction of 70 engineers who had graduated at least five years previously. He found that the counselors' prediction of satisfaction was low. It is of further interest to note that the *Kuder Preference Record's* scientific and mechanical scales and Group II of the *SVIB* were not significantly correlated with job satisfaction.

Additional References: Herzberg and others (1957); Mayo and Thomas (1956).

Bibliography

- ANDREW, D. C., and STROUP, FRANCIS. "Plans of Arkansas High School Seniors." *Personnel and Guidance Journal* 39: 300-302; December 1960.
- BEAVER, ALMA P. "Psychometric Data and Survival in a College of Nursing." *Psychological Reports* 2: 223-26; June 1956.
- BOROW, HENRY. "Research Programs in Career Development." *Journal of Counseling Psychology* 7: 62-70; Spring 1960.
- BOROW, HENRY. "Vocational Development Research: Some Problems of Logical and Experimental Form." *Personnel and Guidance Journal* 40: 21-25; September 1961.
- BOURDO, ERIC A., JR. "The Interests of Forestry Students." *Educational and Psychological Measurement* 14: 680-86; Winter 1954.
- BRAYFIELD, ARTHUR H., and MARSH, MARY MARKLEY. "Aptitudes, Interests, and Personality Characteristics of Farmers." *Journal of Applied Psychology* 41: 98-103; April 1957.
- BRODY, DAVID S. "Kuder Interest Patterns of Professional Forest Service Men." *Educational and Psychological Measurement* 17: 599-605; Winter 1957.
- CRITES, JOHN O. "Ego-Strength in Relation to Vocational Interest Development." *Journal of Counseling Psychology* 7: 137-43; Summer 1960.
- DIPBOYE, W. J., and ANDERSON, W. F. "The Ordering of Occupational Values by High School Freshmen and Seniors." *Personnel and Guidance Journal* 38: 121-24; October 1959.
- DIPBOYE, W. J., and ANDERSON, W. F. "Occupational Stereotypes and Manifest Needs of High School Students." *Journal of Counseling Psychology* 8: 296-304; Winter 1961.
- DUNNETTE, MARVIN D. "Vocational Interest Differences Among Engineers Employed in Different Functions." *Journal of Applied Psychology* 41: 273-78; October 1957.

- FORREST, AUBREY L. "Persistence of Vocational Choice of the Merit Scholarship Winners." *Personnel and Guidance Journal* 39: 466-71; February 1961.
- GONYEA, GEORGE G. "Dimensions of Job Perceptions." *Journal of Counseling Psychology* 8: 305-13; Winter 1961.
- GUBA, E. G., and GETZELS, J. W. "Interest and Value Patterns of Air Force Officers." *Educational and Psychological Measurement* 16: 465-70; Winter 1956.
- HAGEN, DOUGLAS. "Careers and Family Atmospheres: An Empirical Test of Roe's Theory." *Journal of Counseling Psychology* 7: 251-56; Winter 1960.
- HEWER, VIVIAN H. "A Comparison of Successful and Unsuccessful Students in the Medical School at the University of Minnesota." *Journal of Applied Psychology* 40: 164-68; June 1956.
- HOLDEN, GEORGE S. "Scholastic Aptitude and the Relative Persistence of Vocational Choice." *Personnel and Guidance Journal* 40: 36-41; September 1961.
- KLINE, MILTON V., and CUMINGS, RUTH. "A Study of the Learning Characteristics of Public Health Nurses in Relation to Mental Health Education and Consultation: IV, Kuder Vocational Interest Patterns." *Journal of Genetic Psychology* 88: 37-59; March 1956.
- LEWIS, EDWIN C., and MACKINNEY, ARTHUR C. "Counselor vs. Statistical Predictions of Job Satisfaction in Engineering." *Journal of Counseling Psychology* 8: 224-30; Fall 1961.
- LOCKWOOD, WILLIAM V. "Realism of Vocational Preference." *Personnel and Guidance Journal* 37: 98-106; October 1958.
- LONG, J. ROBERT. "Academic Forecasting in the Technical-Vocational High School Subjects." *Personnel and Guidance Journal* 37: 666-68; May 1959.
- MCCORNACK, ROBERT L. "Vocational Interests of Male and Female Social Workers." *Journal of Applied Psychology* 40: 11-13; February 1956.
- NACHMANN, BARBARA. "Childhood Experience and Vocational Choice in Law, Dentistry, and Social Work." *Journal of Counseling Psychology* 7: 243-50; Winter 1960.
- PATTERSON, C. H. "A Kuder Pattern for Bakers and Baking Students." *Personnel and Guidance Journal* 35: 110-11; October 1956.
- ROTHNEY, JOHN W. M. *Guidance Practices and Results*. New York: Harper & Brothers, 1958. 542 pp.
- SAMUELSON, CECIL O. "Interest Scores in Predicting Success of Trade School Students." *Personnel and Guidance Journal* 36: 538-41; April 1958.
- SCHUTZ, RICHARD A., and BLOCHER, DONALD H. "Self-Concepts and Stereotypes of Vocational Preferences." *Vocational Guidance Quarterly* 8: 241-44; Summer 1960.
- SCHUTZ, RICHARD A., and BLOCHER, DONALD H. "Self-Satisfaction and Level of Occupational Choice." *Personnel and Guidance Journal* 39: 595-98; March 1961.
- SEGAL, STANLEY J. "A Psychoanalytic Analysis of Personality Factors in Vocational Choice." *Journal of Counseling Psychology* 8: 202-10; Fall 1961.
- STEFFLRE, BUFORD. "Analysis of Inter-Relationships of Ranking of Occupations." *Personnel and Guidance Journal* 37: 435-38; February 1959.
- STEPHENSON, RICHARD R. "Occupational Choice as a Crystallized Self-Concept." *Journal of Counseling Psychology* 8: 211-16; Fall 1961.
- SUPER, DONALD E., and OVERSTREET, PHOEBE L. *The Vocational Maturity of Ninth Grade Boys*. New York: Bureau of Publications, Teachers College, Columbia University, 1960. 212 pp.
- SUPER, DONALD E., and OTHERS. *Vocational Development: A Framework for Research*. New York: Bureau of Publications, Teachers College, Columbia University, 1957. 142 pp.
- TIEDEMAN, DAVID V. "Decision and Vocational Development: A Paradigm and Its Implications." *Personnel and Guidance Journal* 40: 15-21; September 1961.
- WITKIN, ARTHUR A. "Differential Interest Patterns in Salesmen." *Journal of Applied Psychology* 40: 338-40; October 1956.

Additional References

- HERZBERG, FREDERICK, and OTHERS. *Job Attitudes: Review of Research and Opinion*. Pittsburgh: Psychological Service of Pittsburgh, 1957. 279 pp.

- MAYO, GEORGE DOUGLAS, and THOMAS, DAVID S. "Agreement Between Counselor-Counselee Vocational Decisions and Interest Inventory Scores." *Personnel and Guidance Journal* 35: 37-38; September 1956.
- MERWIN, JACK C., and DiVESTA, FRANCIS J. "A Study of Need Theory and Career Choice." *Journal of Counseling Psychology* 6: 302-308; Winter 1959.
- O'HARA, ROBERT P., and TIEDEMAN, DAVID V. "Vocational Self-Concept in Adolescence." *Journal of Counseling Psychology* 6: 292-301; Winter 1959.
- THORNDIKE, ROBERT L., and HAGEN, ELIZABETH P. *Ten Thousand Careers*. New York: John Wiley & Sons, 1959. 346 pp.
- TYLER, LEONA E. "Research Explorations in the Realm of Choice." *Journal of Counseling Psychology* 8: 195-201; Fall 1961.
- WOLFBEIN, SEYMOUR L. "Transition from School to Work: A Study of the School Leaver." *Personnel and Guidance Journal* 38: 98-105; October 1959.

CHAPTER III

Agricultural Education

LLOYD J. PHIPPS

RECENT RESEARCH in public school agricultural education reflects the increased interest in evaluation, the adjustments necessitated by changes in agriculture, the identification and recognition of nonfarm agricultural occupations, the shortage of persons professionally educated in agriculture, and the expansion of general or nonvocational agriculture. Many of the 736 studies which were conducted during the past six years and summarized by the American Vocational Association, Research Committee, Agricultural Education Section (1957, 1958, 1959, 1960, 1961) were concerned with problems in these areas. During the past six years, interest continued in studies relating to young and adult farmer education, teacher education, methods of teaching, and course content.

Evaluating the Program

Several recent developments have focused attention on problems pertaining to the function, value, and importance of agricultural education. The shortage of students studying agriculture in colleges and universities has suggested questions regarding the relationship between agricultural education at the secondary level and agricultural education in colleges and universities.

College Success

Bass (1961), Bender and Pierce (1961), and Thompson (1958) studied the success of former vocational agriculture students in college. Their research indicated that students who studied vocational agriculture in high school succeeded as well as or slightly better than control groups who had not studied vocational agriculture in high school. Bender and Pierce found that the number of dropouts from and transfers out of the Ohio State University College of Agriculture was less among the students who had studied vocational agriculture in high school than among the control group.

Tom (1960) summarized 32 studies relating to college success of former students of vocational agriculture. He found that 53.8 percent of the studies showed that the vocational group did better than the nonvocational group. Only 9.6 percent showed that the vocational group did less

well than the nonvocational group. Various research designs were employed in these investigations.

Success in Nonfarm Occupations

The decrease in number of farms has directed attention to the relationships between the studying of vocational agriculture and the success in nonfarm occupations in agricultural business and industry.

Christensen (1959) compared the graduates of two groups of equivalent schools. One group of schools offered agriculture courses; the other group did not. He found among the graduates engaged in nonfarm agricultural jobs nonsignificant differences concerning the degree of expressed occupational satisfaction and income between graduates in vocational agriculture and those in nonvocational agriculture. Jones (1960) also paired schools offering vocational agriculture with schools not offering vocational agriculture and found a lack of statistically significant differences for annual occupational income between the graduates with and without vocational agriculture who were engaged in occupations not related to farming.

General Studies on Agricultural Education.

Emphasis on science, mathematics, foreign languages, and guidance motivated many studies in agricultural education. Webb (1961) attempted to determine in a carefully designed investigation how well senior boys in high school with and without vocational agriculture in their course of study understood scientific concepts. His findings indicated that the scientific knowledge retained by the students varied more because of the level of student ability than as a result of subject matter pattern.

Of the subject matter patterns studied, the combination of two or more years of vocational agriculture plus two or more years of basic science courses gave students the best understanding of scientific concepts. The students with this subject matter pattern also excelled in their retention of scientific concepts. Cragun (1961) reported that a substantial amount of factual scientific knowledge is taught in vocational agriculture and that this knowledge is retained to a considerable extent. His statistical analysis showed no significant difference in level of scientific knowledge between pupils with training in vocational agriculture and those with two or more years of science but with no training in vocational agriculture.

Stevenson (1958) studied the influence of high school vocational agriculture on farm mechanics practices and reported significant differences favoring the vocational agriculture graduates with respect to practices in farm mechanics.

Blake (1957) investigated the influence of training in vocational agriculture in high school on the rate of establishment in farming. His test of significance of variation by analysis of covariance indicated a highly significant difference in the rate of establishment in farming in favor of the graduates in vocational agriculture.

The role and value of the Future Farmers of America (FFA), the intramural organization in vocational agriculture, was re-examined. Bail (1960) noted statistically significant differences between pupils' and teachers' attitudes regarding certain facets of the FFA. He concluded that teachers need to make provisions for members to voice their opinions about policies which affect them. Clanin (1958) noted that in recent years former FFA members are giving FFA important and increased credit for augmenting agricultural knowledge and motivation for farming, for making possible the formation of many friendships, for teaching how to accept responsibilities, and for developing self-confidence.

Recent turmoil over the objectives of education produced renewed interest in the opinions and attitudes of others regarding agricultural education. Nelson, Woerdehoff, and Coster (1960) appraised the programs of vocational agriculture and industrial education. Their contribution represented a comprehensive and well-designed study. Some of the appraisal techniques employed are worthy of careful consideration by other research workers. They noted a need (a) to emphasize purposes in agricultural education that are closely related to technological and managerial changes in agriculture, (b) to emphasize operations at higher levels, and (c) to provide resources which enable operations to be conducted at higher levels.

Agricultural Education and Nonfarm Occupations

Studies investigating various aspects of agricultural education as it relates to nonfarm occupations in agricultural business and industry were numerous. Prior to 1956, very little attention was given to research questions in this area. Interest apparently resulted from the recent rapid growth in the number of persons employed by agricultural business and industry and from the corresponding shortage of workers with technical education in agriculture.

Some of the first studies in this area were concerned with the contributions of vocational agriculture in secondary schools to persons employed off the farm. An example of a carefully done study of this type is the research of Bittner (1959). He found no important differences between the occupational status of persons employed off the farm who had studied vocational agriculture and those who had not.

Several studies were directed toward the identification of occupations in agricultural business and industry requiring agricultural education, the determination of the numbers of persons employed in these occupations,

and the description of the kind of agricultural training required for these occupations. Sutherland and Thompson (1957) conducted a pioneering study in California in this area. Their findings did not support the oft-repeated statement that general education is considered more important by employers than more specific vocational training.

Another research development was the identification of training needs in agricultural business. Thompson (1959) selected the nursery-products industry for study. He found a definite need for certain high school, junior college, and four-year college departments in agriculture to attract and to prepare individuals for work in the nursery industry.

Many of the research projects relating to education for jobs in agricultural business were global status studies. Clark (1959) extended the scope of these studies by analyzing the skills, abilities, and understandings that people engaged in these occupations must possess. He reported that managers and many workers in agricultural business need both manipulative skills and managerial abilities in agriculture. Kennedy (1958) attempted to clarify the relation between farming and certain other agricultural occupations. He concluded that agricultural occupations can be rated on the basis of the knowledge of farming needed by workers in the occupations and that many occupations previously regarded as related to agriculture require relatively little knowledge of farming. His study was one of the first to call attention to the need to analyze each type of job opportunity in agricultural business in order to determine whether agricultural knowledge is required. A question might be raised regarding Kennedy's implied assumption that knowledge of farming and knowledge of agriculture are synonymous.

Adjusting to Agricultural Changes

Rapid technological change in agriculture directed the attention of research workers to questions relating to the adjustment of agricultural education to the changes in agriculture. Deyoe (1959) interviewed teachers in order to determine the nature of the adjustments being made in their local programs of vocational education in agriculture to accompany changes in agriculture. He found that the teachers not only were concerned about keeping pace with new developments but also were active in adjusting their teaching to new developments in agriculture.

An important change in agriculture has been the increase of part-time farmers in certain geographical areas. In devoting their attention to this phenomenon, Cardozier (1958) and Deyoe (1957) concluded that part-time farmers can profit from agricultural education, but the instruction provided should differ from that offered full-time farmers.

The decrease in number of farmers and the increase of off-farm agricultural jobs suggested questions regarding the criteria for determining the need for agricultural education at the secondary school level. Carpenter

(1960) noted that, despite the decrease in number of farmers, vocational education in agriculture in Missouri was denied many present and prospective farmers because of the limited offering of vocational agriculture by the school districts. Carpenter found that 60 percent of the boys becoming farmers were not being served because of some lack of educational opportunity in vocational agriculture. Studies of a similar nature are needed in other states. Of considerable aid in carrying out such investigations should be Lamar's (1957) presentation of 17 criteria for use in determining the need for vocational agriculture.

General or Nonvocational Agriculture

Following the passage of the Smith-Hughes Act, vocational education in agriculture overshadowed general or nonvocational education in agriculture at the secondary school level. In recent years, a resurgent interest has developed in nonvocational education in agriculture. This has promoted research on problems involved in nonvocational education in agriculture.

Burson (1958) analyzed general agriculture in the secondary schools in California, the state that has given the most attention to general agriculture. He reported that general agriculture offerings were increasing and that the instruction was designed (a) to develop an understanding and appreciation of agriculture and (b) to help pupils become more useful citizens through an understanding of agriculture.

Baker (1959) turned his attention to the technical education in agriculture needed by teachers of general agriculture. In comparing the attitudes of teachers of general agriculture with the attitudes of persons engaged in occupations in agriculture, Baker reported a significant difference regarding the importance of various types of content often taught in general agriculture courses. His findings seemed to indicate the need for changes in the content of some general agriculture courses.

Higher Education

The increasing shortage of persons professionally educated in agriculture has renewed interest in research questions in this area. Many studies are anticipated during the next few years. The role of the junior college has been given considerable attention. Phillips (1956) conducted a status study of agricultural education in the junior colleges of California. He found 100 junior colleges providing agricultural education. These colleges provided both terminal and transfer courses for agriculture. They provided not only agriculture courses that were designed as vocational education for farming but also other courses for vocational and technical

education for nonfarm agricultural jobs. Brazziel (1957, 1958) determined the scope of instruction provided in colleges other than land-grant colleges in the United States. Of the 73 institutions studied, 56 offered courses in agriculture.

Teske (1958) investigated the attitudes of farm groups toward college training as preparation for farming. An analytical sampling survey method was used. His results indicated a significant negative attitude by the four farm and farm-related groups studied toward the values of college training as preparation for farming.

Additional research is needed to determine whether existing agricultural education curriculums in higher educational institutions meet the diverse and emerging educational needs for agriculture.

Course Content and Teaching Procedures

Instruction in farm mechanics was investigated in several studies. Anthony (1959), Bentley and Clouse (1960, 1961), and Bristol (1961) reported carefully designed and definitive studies relating to course content and teaching methods in farm mechanics. These studies revealed several deficiencies in the present instructional program in farm mechanics and indicated unique procedures for determining instructional content and for devising teaching methods in farm mechanics.

Hudson (1961) focused the attention of agricultural educators on the scientific content in curriculums of vocational agriculture. In his analysis of courses, he reported that 87 percent of the content studied pertained to scientific information.

Bentley and Galloway (1961) investigated the reading ability of pupils studying agriculture and the readability of reference books in agriculture. They found that vocational agriculture students consistently scored higher on the test of ability to read natural science materials than on the general reading tests. They concluded that the ability to read agricultural references may be specific and different from general reading ability.

Some of the best-designed studies and many of the experimental studies in agricultural education were in the area of teaching methods. Sociological studies that influenced the thinking of professional workers in agricultural education regarding teaching methods included those on diffusion-process theory by Beal, Rogers, and Bohlen (1957) and by Rogers (1957).

Andrews (1957) compared the subject matter achievement of pupils taught by teachers who were highly problem oriented with achievement of pupils taught by teachers who were not highly problem oriented. His research hypothesis was that average achievement for the pupils taught by teachers that were not highly oriented would be the greater. However, since the null hypothesis was not rejected, Andrews concluded that his findings appeared favorable to the teachers who were highly problem oriented. Dotson (1958) compared three teaching methods in the teaching

of young farmers. He found that a combination of on-farm and classroom instruction produced significantly higher scores, as measured by a decision-making test, than either on-farm instruction or classroom instruction alone.

Continuing Education for Farmers

The decreasing number of farmers has emphasized the increasing importance of agricultural education for young and adult farmers. Price (1956) and Loreen (1959) attempted to define the factors associated with the development of instructional programs for adult farmers. Price's results refute the assumption often made that age, years of experience, and years of tenure of the teacher are associated with the occurrence of young-farmer programs. Loreen's study placed teachers' lack of time, negative attitude, level of ability, and type of interest as the most important obstacles to adult-farmer education.

In an investigation concerning the participation of farmers in a program designed for them, Phipps (1956) reported pre-enrollment in adult courses as a successful practice. Subsequently, in a case study, Phipps (1959) determined that it was feasible to conduct three- or four-year comprehensive educational programs in agriculture for young farmers.

Bibliography

- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH COMMITTEE, AGRICULTURAL EDUCATION SECTION. *Summaries of Studies in Agricultural Education*. Vocational Division Bulletin No. 265, Agricultural Series No. 69, Supplement No. 10. Washington, D.C.: Government Printing Office, 1957. 94 pp.
- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH COMMITTEE, AGRICULTURAL EDUCATION SECTION. *Summaries of Studies in Agricultural Education*. Vocational Division Bulletin No. 272, Agricultural Series No. 71, Supplement No. 11. Washington, D.C.: Government Printing Office, 1958. 86 pp.
- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH COMMITTEE, AGRICULTURAL EDUCATION SECTION. *Summaries of Studies in Agricultural Education*. Vocational Division Bulletin No. 275, Agricultural Series No. 72, Supplement No. 12. Washington, D.C.: Government Printing Office, 1959. 53 pp.
- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH COMMITTEE, AGRICULTURAL EDUCATION SECTION. *Summaries of Studies in Agricultural Education*. Vocational Division Bulletin No. 282, Agricultural Series No. 75, Supplement No. 13. Washington, D.C.: Government Printing Office, 1960. 90 pp.
- AMERICAN VOCATIONAL ASSOCIATION, RESEARCH COMMITTEE, AGRICULTURAL EDUCATION SECTION. *Summaries of Studies in Agricultural Education*. Vocational Division Bulletin No. 291, Agricultural Series No. 77, Supplement No. 14. Washington, D.C.: Government Printing Office, 1961. 56 pp.
- ANDREWS, DALE WALKER. *Problem Oriented Teaching and Pupil Achievement in Vocational Agriculture*. Doctor's thesis. Minneapolis: University of Minnesota, 1957. 239 pp. Abstract: *Dissertation Abstracts* 18: 1351-52; No. 4, 1958.
- ANTHONY, FRANK. "Determining the Course of Study in Farm Mechanics." *Agricultural Education Magazine* 32: 32-34; August 1959.
- BAIL, JOE P. "The Role of the FFA Organization in Vo-Ag." *Agricultural Education Magazine* 32: 211-12; March 1950.

- BAKER, LEO O. "Technical Agriculture for Teachers of General Agriculture." *Agricultural Education Magazine* 32: 126-27; December 1959.
- BASS, B. C. "To What Extent Do Former Vocational Agriculture Students Succeed in College?" *Agricultural Education Magazine* 34: 134-35, 137; December 1961.
- BEAL, GEORGE M.; ROGERS, EVERETT M.; and BOHLEN, JOE M. "Validity of the Concept of Stages in the Adoption Process." *Rural Sociology* 22: 166-68; June 1957.
- BENDER, RALPH E., and PIERCE, DEWEY. "College Success with and Without Vocational Agriculture in High School." *Agricultural Education Magazine* 34: 124-26; December 1961.
- BENTLEY, RALPH R., and CLOUSE, JAMES P. "Determining the Farm Tractor Phase of Farm Mechanics." *Agricultural Education Magazine* 32: 203-206; March 1960.
- BENTLEY, RALPH R., and CLOUSE, JAMES P. "Plow and Mower Phases of Farm Mechanics." *Agricultural Education Magazine* 33: 151-53; January 1961.
- BENTLEY, RALPH R., and GALLOWAY, R. EDWARD. "Reading Ability and Readability as a Basis for the Selection of Reference Books." *Agricultural Education Magazine* 33: 252-54; May 1961.
- BITTNER, RICHARD H. "Are Vo-Ag Graduates Successful in Nonfarm Occupations?" *Agricultural Education Magazine* 31: 228, 239; April 1959.
- BLAKE, DUANE L. "Influence of High School Vocational Agriculture on the Rate of Establishment of Graduates in Farming." *Agricultural Education Magazine* 30: 83-84; October 1957.
- BRAZZIEL, WILLIAM F., JR. "Instruction in Agriculture in Non-Land-Grant Colleges in the United States." *Agricultural Education Magazine* 30: 42-43, 47; August 1957.
- BRAZZIEL, WILLIAM F., JR. "Teacher Training in Agriculture in Non-Land-Grant Colleges in the United States." *Agricultural Education Magazine* 31: 116; November 1958.
- BRISTOL, BENTON K. "Safe Tractor Operation and Maintenance Programs." *Agricultural Education Magazine* 33: 204-206; March 1961.
- BURSON, CARL E. *The Place of General Agriculture in the Secondary Schools of California*. Davis: Department of Education, University of California, 1958. 16 pp.
- CARDOZIER, V. R. *Part-Time Farming in Tennessee*. Knoxville: Department of Agricultural Education, University of Tennessee, 1958. 12 pp.
- CARPENTER, EARL T. "Need More Vocational Agriculture in Missouri." *Agricultural Education Magazine* 32: 177-78; February 1960.
- CHRISTENSEN, DON N. "Relation Between High School Vocational Agriculture Training and Status of Graduates in Nonfarm Occupations Related to Farming." *Agricultural Education Magazine* 31: 256, 258; May 1959.
- CLANIN, E. E. "Values Received from FFA Membership." *Agricultural Education Magazine* 30: 201-202; March 1958.
- CLARK, RAYMOND M. *Need for Training for Non-Farm Agricultural Business*. East Lansing: Department of Teacher Education, Michigan State University, 1959. 29 pp.
- CRAGUN, JOHN J. "A Comparison of Achievement in Science for Students with and Without Vocational Agriculture Training." *Agricultural Education Magazine* 34: 128-29; December 1961.
- DEYOE, GEORGE P. *Part-Time Farming in Illinois, with Implications for Agricultural Education and for Other Features of Educational Programs in Public Schools*. Urbana: Division of Agricultural Education, University of Illinois, 1957. 27 pp.
- DEYOE, GEORGE P. *Adjusting Local Programs of Vocational Education in Agriculture to Changes in Agriculture*. Urbana: Division of Agricultural Education, University of Illinois, 1959. 64 pp.
- DOTSON, ROBERT SCOTT. *The Comparative Effectiveness of Three Kinds of Teacher-Student Relationships in the Teaching of Budgetary Analysis to Selected Young Adult Dairy Farmers in Pennsylvania*. Doctor's thesis. University Park: Pennsylvania State University, 1958. 261 pp. Abstract: *Dissertation Abstracts* 19: 2875-76; No. 11, 1959.
- HUDSON, AROL. "Analysis of the Scientific Content in Curriculums of Vocational Agriculture." *Agricultural Education Magazine* 34: 33-34; August 1961.
- JONES, ROBERT G. "Influence of High School Vocational Agriculture on the Status of Graduates in Nonfarm Occupations Not Related to Farming." *Agricultural Education Magazine* 32: 232-33; April 1960.
- KENNEDY, WILLIAM H. *A Clarification of Relationships Between Farming and Certain Other Agricultural Occupations with Implications for Guidance and Curriculum*

- Development.* Doctor's thesis. East Lansing: Michigan State University, 1958. 528 pp. Abstract: *Dissertation Abstracts* 19: 3234; No. 12, 1959.
- LAMAR, CARL FLETCHER. *Criteria for Determining the Need for Vocational Agriculture in Kentucky Schools.* Doctor's thesis. Lexington: University of Kentucky, 1957. 522 pp.
- LOREEN, C. OSCAR. "Factors Associated with Adult Class Development." *Agricultural Education Magazine* 32: 54-56; September 1959.
- NELSON, NORBERT J.; WOERDEHOFF, FRANK J.; and COSTER, JOHN K. *Vocational Education in Public Schools as Related to Social, Economic, and Technical Trends. Part II: The Appraisal of Programs of Vocational Agriculture and Industrial Education.* Studies in Education No. 2. Lafayette, Ind.: Division of Education, Purdue University, 1960. 489 pp.
- PHILLIPS, LOREN D. "Agricultural Programs in the Junior College." *Agricultural Education Magazine* 29: 18-20; July 1956.
- PHIPPS, LLOYD J. "Pre-Enrollment of Farmers in Adult Courses." *Agricultural Education Magazine* 29: 85, 87; October 1956.
- PHIPPS, LLOYD J. *A Comprehensive Agricultural Education Program for Young Farmers.* Urbana: Division of Agricultural Education, University of Illinois, 1959. 37 pp.
- PRICE, ROBERT R. *Factors Associated with the Occurrence of Local Young Adult Farmer Instructional Programs in Vocational Agriculture in the States of Pennsylvania and Oklahoma.* Doctor's thesis. University Park: Pennsylvania State University, 1956. 335 pp. Abstract: *Dissertation Abstracts* 17: 281-82; No. 2, 1957.
- ROGERS, EVERETT M. "Personality Correlates of the Adoption of Technological Practices." *Rural Sociology* 22: 267-68; September 1957.
- STEVENSON, PAUL N. "Influence of High School Vocational Agriculture on Farm Mechanics Practices Used by Students Prior to Enrolling at Iowa State College." *Agricultural Education Magazine* 30: 148-49; January 1958.
- SUTHERLAND, S. S., and THOMPSON, O. E. *The Training Required by Workers in Agricultural Business and Industry in California.* Sacramento: California State Department of Education, 1957. 40 pp.
- TESKE, PHILIP RALPH. *Attitudes of Farm and Farm-Related Groups Toward College Training in Agriculture as Preparation for Farming.* Doctor's thesis. Minneapolis: University of Minnesota, 1958. 273 pp. Abstract: *Dissertation Abstracts* 19: 1258-59; No. 6, 1958.
- THOMPSON, ORVILLE E. "College Achievement of High School Vocational Agriculture Students." *California Journal of Educational Research* 4: 175-78, 185; September 1958.
- THOMPSON, ORVILLE E. *Training Requirements of Workers in the Production and Distribution of Nursery Plants.* Sacramento: California State Department of Education, 1959. 29 pp.
- TOM, FREDERICK K. T. "College Success of Former Students of Vocational Agriculture." *Agricultural Education Magazine* 32: 172-76; February 1960.
- WEBB, E. M. "A Study of How High School Senior Boys Who Have Studied Vocational Agriculture in High School Rate in Their Understanding of Scientific Concepts." *Agricultural Education Magazine* 34: 131-32, 138-39; December 1961.

CHAPTER IV

Home Economics Education

JUNE COZINE

THIS CHAPTER is limited mainly to research carried out by (a) professional workers and graduate students in home economics education and (b) other home economists who, as majors in a special subject matter area of home economics, have selected problems with educational emphasis. The type of published reports available also served to limit what could be reviewed.

Although a substantial portion of the research has been done by graduate students, a number of professional workers have been pursuing research studies, either independently or in cooperation with others. It would appear that there has been an increase in the amount of cooperative research between various disciplines within and without the home economics field and between various agencies and organizations.

A comparison made by the U.S. Department of Agriculture, Agricultural Research Service, and the U.S. Department of Health, Education, and Welfare, Office of Education (1956-60) of the number of theses in home economics education as reported in *Titles of Completed Theses in Home Economics and Related Fields in Colleges and Universities of the United States* shows that between the spans 1950-55 and 1956-60 there has been (a) a decrease in the number of theses at the master's level from 585 to 525 and (b) an increase at the doctor's level from 77 to 98. Responses from state supervisors would indicate that a high degree of interest in action research has arisen and that several states have initiated studies within the last year or two. The leadership and assistance that has been given by the staff members of the Home Economics Education Branch of the Office of Education, through (a) special publications compiled by Spafford and Amidon (1959, 1960), (b) studies by staff members, e.g., Coon (1962), and (c) assistance in conferences and workshops, has undoubtedly contributed to an increase in both quantity and quality of research during this period.

Elementary and Junior High School

Even though various phases of home economics have been extensively incorporated into many elementary school programs, the amount of research reported at this level has been limited. The majority of investigations that have been done as master's theses have not been published. In an evaluation study of a six-year nutrition program, Sostman (1957)

found that children who were in the experimental school during at least three years of the six-year program showed significantly greater gains in weight and height than children of similar background and age attending other schools. He also found that teachers and administrators considered the program valuable since nutritional status could be correlated with other variables. Boyd's (1957) identification of the type of learning opportunities in nutrition used by 159 elementary teachers provided an extensive list for use by individual teachers, as well as by program and curricular specialists.

Otto (1957) has made a unique contribution through the application of the findings of her study to the development of new designs in homemaking programs in junior high school. The philosophy presented in the conceptual framework of the program was consistent with the administrative organization, methods, resources, and facilities desired for future development in home economics. The method employed should be applicable for other areas and levels.

Additional Reference: Cawley (1958).

Secondary School

More than half of the research studies reported in home economics education have been at the secondary level, including the seventh and eighth grades. For an over-all picture of the extent and nature of home economics at this level, Coon's (1962) summary of a national survey provided much statistical information. When one learns that in 1959 there were approximately 15,720 secondary schools with an enrollment of 100 or more offering home economics and that 2.353 million, or 49 percent, of the total girls enrolled and 63,000, or 1 percent, of the total boys enrolled were taking home economics, it is easy to understand why a majority of the published research studies have been at this level.

The data reported by Coon were secured through a questionnaire survey of a random sample of secondary schools in the 50 states and the District of Columbia. Since the questionnaire was similar to the one used in 1939, it was possible to compare the findings of the two studies.

Basis for Program Development

During the past six years, various techniques have been used in identifying factors and changes in our society which have direct bearing on the success of programs in home economics. Hurt (1956) used Warner's index of status characteristics and country index of social characteristics for classifying the 60 students used as her sample and validated the classification by using *The American Home Scale*, developed by Kerr and Remmers. Through this classification, she found that this group of students repre-

sented three classes: lower middle, upper lower, and lower lower. A review of textbooks revealed that middle-class practices were included, while interviews with a sample of mothers showed different values and practices. It was recommended that Warner's index of social characteristics would be helpful to other teachers in studying home backgrounds of their students in order that home economics instruction could be adapted to the social-class status of students.

Schubert and Dalrymple (1959) analyzed responses to a questionnaire by 104 young homemakers in an attempt to identify (a) recognized problems and needs, (b) methods used for solving homemaking problems, and (c) sources of help used in seeking solutions. Implications for development of curriculum were drawn. Warner (1957) designed five instruments to be used for securing informational background for the homemaking teacher as a basis for preplanning. The devices consisted of a pupil opinionnaire, a parent opinionnaire, an interview schedule for administrators, an interview schedule for local residents, and a community observation check list.

Additional References: Bemis (1958); Little (1960); Schroeder (1960).

Evaluation

During this six-year period, a variety of evaluative techniques and devices have been developed, and many more devices that were developed for use in other areas have been used or adapted. Croft (1959) employed a battery of instruments for measuring the ability of high school pupils in clothing construction and developed regression equations for the prediction of achievement in this phase of homemaking. Although this was an exploratory study, the results would indicate that achievement in clothing construction by high school girls can be satisfactorily predicted through use of a battery composed of a clothing construction test, the Miller *Survey of Object Visualization*, and a finger dexterity questionnaire. Horn (1959), using a sample of 300 early-adolescent girls, found that there were statistically significant differences (a) between developmental levels and occupational groupings of fathers in their interest in certain aspects of clothing and (b) between developmental levels and ability to handle tools. She also found a positive correlation between measures of spatial perception and of the ability to handle tools. Both studies contain implications for strengthening the constructional phase of clothing at the high school level.

Because increased emphasis has been placed on personal and family relations, a need for appraisal devices for less tangible behaviors has resulted. Kilpatrick (1960) developed a Q-sort to help the high school girl and her homemaking teacher to determine areas of strength in the girl's self-discipline. Fifteen homemaking teachers helped in identifying the four segments of behavior to be studied. Eighty descriptive statements

were prepared, 10 indicating the practice of good self-discipline and 10 indicating the lack of self-discipline for each segment of behavior. The sample included sorts from 300 students in homemaking classes. Results from statistical treatment of data would indicate that this was a valid and reliable technique for assessing this type of behavior.

Attitudes Toward Home Economics and Its Teachers

The attitudes of students, administrators, and guidance counselors toward home economics have been regarded as of major importance in recruiting students and professional workers. Barkley (1956) used the answers from a free-response instrument with high school boys and girls for developing an instrument called *What Are Women Teachers Really Like?* Key phrases, including sections on appearance, classroom behavior, and personal relations with others, were used for teachers of home economics, English, business education, and physical education. Responses from 796 boys and girls were analyzed to see whether the concepts held by these students were standardized and could be stereotyped. Using an original instrument, *Teachers' Characteristics Inventory*, Whiteford (1955) questioned a random sample of high school administrators about typical female teachers in five areas. Principals characterized the teacher in home economics as being motherly, feminine, and creative. Goldsmith (1960) analyzed the responses of superintendents, principals, and guidance counselors to statements reflecting attitudes toward teachers of home economics, the curriculum, and administrative functions. The attitudes were more favorable than unfavorable on 44 of the 75 statements and more unfavorable than favorable on 14 of the statements.

College Programs

Philosophy

The most extensive study concerning psychological aspects of a college program in home economics was done by Clarke (1960), who studied the expressed goals of 91 educators in home economics and of 687 senior students in 35 land-grant colleges and universities and in four additional colleges in 36 states. A unique instrument, *Which Choice Would You Make?* was developed. Each respondent ranked a series of eight goals twice, ranking the goals first in order of importance and second through the paired-comparison procedure. Agreement was found for the goal that all considered most important (development of the individual and the family) and for the least important (integration of the basic principles of science and art). There was strong indication that the stated goals of the students in home economics were related to the goals of their teachers and that the goals of the teachers tended to contribute to the nature of the underlying goals of their students.

In reporting on the first part of a study to determine discrepancies between beliefs and practices, Johnson and others (1961) found agreement for a national sample of 76 educators concerning their beliefs. The investigation also recognized the tendency for students to accept the same beliefs or goals as those held by their teachers.

Characteristics and Abilities of Students

Simpson (1955) used the *Mooney Problem Check List* with 600 women students at the University of Illinois. Additional items which dealt with problems of special concern to students in home economics were added. Simpson found that these students, in comparison with those in other curricular areas, expressed greater concern with problems in adjustment to college work. Courses in chemistry and rhetoric were considered most difficult.

Having used two diagnostic instruments, *The Blacky Pictures: A Technique for the Exploration of Personality Dynamics* and *Traditional Family Ideology Scale*, Logan (1960) analyzed the data for 48 selected students enrolled at the University of Tennessee representing four areas of specialization: home economics, liberal arts, business administration, and nursing. Her findings revealed that the home economics students showed fewer disturbances on the personality dimension as measured by *The Blacky Pictures* than did the students from the other three areas. Statistically significant differences were also found between sets of scores on the second instrument. The home economics students tended (a) to be less dependent upon other people, (b) to give evidence of creative potentiality, (c) to be less conventional in their approach to life, (d) to hold a positive self-concept, (e) to place emphasis on self-discipline, and (f) to reveal evidence of positive parental identification.

Additional References: Gentry (1959); Gingles (1958); Hall (1960).

Historical Studies

Two historical studies have been reported: one on the development of home economics in the United States, by Porch (1955), and the other on development in Canada, by Rowles (1956). Porch traced the philosophies and purposes of home economics indicative of the trends and developments from 1909 through 1952 and related her observations to selected phases of the social background of the times.

Teacher Education

A number of studies appeared in the area related to the preservice and in-service training of teachers for the secondary program. Varied ap-

proaches have been used in studying competencies, satisfactions, activities, and training needs.

Youmans (1957) found that the size of the teaching load, the enrollment in high school, the years of teaching experience, and the teachers' attitudes toward teaching assignments were not related to the amount of time spent on the profession. There were two possible exceptions: (a) teachers in schools with 300 to 499 students enrolled seemed to spend more time than teachers in larger or smaller schools; and (b) first-year teachers seemed to spend more time on planning and studying than experienced teachers.

Three studies have been reported on students' ratings of teachers. Savage (1958) designed a rating scale based on the free responses of 425 home economics students in high school on their concept of an ideal student teacher. Using the rating scale, two groups of students evaluated student teachers at the beginning and at the end of the student-teaching period. The student teachers who had access to pupils' first ratings seemed to stand slightly higher at the end than the other group. In her study to learn how teachers' concern is perceived by students and whether teachers' concern is measurable, Nygren (1960) devised the instrument, Student Estimate of Teacher Concern. Ray (1960) made revisions in this instrument and used it in a study to investigate the potential value of students' ratings for determining the effectiveness of teaching. A comparison of the ratings of the nine teachers in the study showed that they were related to other criterion measures.

Scott (1960) attempted to identify professional problems which were unique to a group of teachers who had entered or re-entered the teaching of homemaking after a period of five or more years between their preservice preparation and recent employment. Questionnaires were sent to (a) state supervisors, (b) married teachers who had recently entered or re-entered teaching, (c) married teachers who had been teaching continuously for five or more years, and (d) administrators employing the teachers. Scott found no problems unique to the group entering or re-entering teaching five or more years after their preservice training.

Additional References: Lathrop (1958); Laws (1956).

Suggested Future Research

The proposals made by Lehman (1960) for research in home economics education during the next 50 years would certainly serve to strengthen the contributions of research-oriented individuals in home economics education. Lehman proposed the following: (a) Studies should be related to one another in order that more worthwhile contributions could be made to the solution of significant problems. (b) Research culminating in a thesis should be a part of each master's degree. (c) Two or three special training centers should be installed for the development of research leaders. (d)

More cooperative research should exist both within an institution and among a group of colleges or states. (e) Findings should be made more readily available.

Only partial answers have been found in regard to (a) meeting the needs of increased enrollment in schools and colleges; (b) filling the varied needs, interests, and capacities of students; (c) identifying criteria for effecting changes in teacher-learning procedures; and (d) utilizing the resources represented by the teacher. If education in home economics is to improve, emphasis on research must be increased. The new resources for research as presented by Swanson (1961) as well as those used in other fields need to be studied and adapted to educational problems in home economics.

Bibliography

- BARKLEY, MARGARET K. *The Concept of the Home Economics Teacher Held by High School Students*. Doctor's thesis. Urbana: University of Illinois, 1956. 165 pp. Abstract: *Journal of Home Economics* 49: 223; March 1957.
- BOYD, FANNIE L. *An Appraisal Device for Teachers in the Elementary School To Determine Opportunities for Learnings in Nutrition*. Doctor's thesis. New York: Teachers College, Columbia University, 1957. 162 pp. Abstract: *Journal of Home Economics* 51: 217; March 1959.
- CLARKE, F. JUNE. *Which Choices Would You Make? The Expressed Goals of Home Economics Educators and Their Students with Implications for Home Economics Education*. Doctor's thesis. Ithaca, N.Y.: Cornell University, 1960. 238 pp. Abstract: *Journal of Home Economics* 53: 230-31; March 1961.
- COON, BEULAH L. *Home Economics in the Public Secondary Schools*. U.S. Department of Health, Education, and Welfare, Office of Education, Circular No. 661. Washington, D.C.: Government Printing Office, 1962. 152 pp.
- CROFT, ELLA JOYCE. "Prediction of Clothing Construction Achievement of High School Girls." *Educational and Psychological Measurement* 19: 653-55; Winter 1959.
- GOLDSMITH, FRANCES S. *Attitudes of Secondary School Superintendents, Principals, and Guidance Counselors Toward Some Aspects of Home Economics*. Doctor's thesis. Lafayette, Ind.: Purdue University, 1960. 195 pp. Abstract: *Journal of Home Economics* 53: 231-32; March 1961.
- HORN, FERN M. *A Study of the Relationships Between Certain Aspects of Clothing and the Ability To Handle Selected Clothing Construction Tools with the Developmental Levels of Early Adolescent Girls*. Doctor's thesis. East Lansing: Michigan State University, 1959. 266 pp. Abstract: *Dissertation Abstracts* 20: 3278; No. 8, 1960.
- HURT, MARY LEE. "Adapting Home-Economics Instruction to the Social-Class Status of Students." *School Review* 64: 260-66; September 1956.
- JOHNSON, HILDEGARDE, and OTHERS. "Our Educational Beliefs." *Journal of Home Economics* 53: 175-78; March 1961.
- KILPATRICK, JULIA. *The Q-Sort: An Evaluation of Its Effectiveness in Assessing Certain Aspects of Self-Discipline Among High School Girls*. Doctor's thesis. University Park: Pennsylvania State University, 1960. 128 pp. Abstract: *Dissertation Abstracts* 21: 2698-99; No. 9, 1961.
- LEHMAN, RUTH T. "The Next Fifty Years in Home Economics Education Research." *Journal of Home Economics* 52: 23-26; January 1960.
- LOGAN, NELL P. *Personality Correlates of Undergraduate Students Selecting Home Economics as an Area of Specialization in College*. Doctor's thesis. Knoxville: University of Tennessee, 1960. 155 pp. Abstract: *Dissertation Abstracts* 21: 2268-69; No. 8, 1961.
- NYGREN, GERTRUDE. "Teacher Concern and Its Measurement." *Journal of Home Economics* 52: 177-80; March 1960.

- OTTO, ARLEEN C. *An Expanding Concept of Junior High School Homemaking Programs in the Western States*. Doctor's thesis. New York: Teachers College, Columbia University, 1957. 150 pp. Abstract: *Journal of Home Economics* 50: 223-24; March 1958.
- PORCH, LOUISE W. *Home Economics: Trends and Developments, 1909-1952*. Doctor's thesis. Stanford, Calif.: Stanford University, 1955. 275 pp. Abstract: *Journal of Home Economics* 49: 225-26; March 1957.
- RAY, ELIZABETH. "Teacher Concern Related to Teaching Effectiveness." *Journal of Home Economics* 52: 181-84; March 1960.
- ROWLES, EDITH. *A Brief History of Some Early Canadian Developments in Home Economics*. Doctor's thesis. New York: Teachers College, Columbia University, 1956. 227 pp. Abstract: *Journal of Home Economics* 50: 224; March 1958.
- SAVAGE, MARJORIE L. *Changes in Student Teachers Through Use of Pupil Ratings*. Doctor's thesis. Urbana: University of Illinois, 1958. 131 pp. Abstract: *Journal of Home Economics* 51: 219-20; March 1959.
- SCHUBERT, GENEVIEVE W., and DALRYMPLE, JULIA L. "Problems and Needs of Young Homemakers: Implications for High School Home Economics." *Journal of Home Economics* 51: 365-67; May 1959.
- SCOTT, MARY JANE. *In-Service Educational Needs of a Selected Group of Homemakers Who Entered or Re-Entered the Teaching of Homemaking*. Doctor's thesis. Knoxville: University of Tennessee, 1960. 228 pp. Abstract: *Dissertation Abstracts* 21: 337; No. 2, 1960.
- SIMPSON, ELIZABETH J. *Distinctive Personal Problems of Home Economics Students at the University of Illinois*. Doctor's thesis. Urbana: University of Illinois, 1955. 216 pp. Abstract: *Journal of Home Economics* 49: 226-27; March 1957.
- SOSTMAN, EDNA R. *An Evaluation of the Methods, Techniques, and Findings Used During a Six-Year Nutrition Education Program in a City School*. Doctor's thesis. New York: Teachers College, Columbia University, 1957. Abstract: *Journal of Home Economics* 51: 220; March 1959.
- SPAFFORD, IVOL, and AMIDON, EDNA P. *Studies on the Teaching of Home Economics in Colleges and Universities, 1955-56*. U.S. Department of Health, Education, and Welfare, Office of Education, Vocational Division, Bulletin No. 276, Home Economics Education Series No. 31. Washington, D.C.: Government Printing Office, 1959. 144 pp.
- SPAFFORD, IVOL, and AMIDON, EDNA P. *Studies of Home Economics in High School and in Adult Education Programs, 1955-58*. U.S. Department of Health, Education, and Welfare, Office of Education, Vocational Division, Bulletin No. 286, Home Economics Education Series No. 32. Washington, D.C.: Government Printing Office, 1960. 185 pp.
- SWANSON, PEARL. "New Resources for Research." *Journal of Home Economics* 53: 161-72; March 1961.
- U.S. DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESEARCH SERVICE, and U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION. *Titles of Completed Theses in Home Economics and Related Fields in Colleges and Universities of the United States*. Washington, D.C.: Government Printing Office, 1956-61. 1956, 59 pp.; 1957, 47 pp.; 1958, 41 pp.; 1959, 41 pp.; 1960, 49 pp.; 1961, 52 pp.
- WARNER, WILMA. *Bases for Implementing a Local Homemaking Program*. Doctor's thesis. East Lansing: Michigan State University, 1957. 252 pp. Abstract: *Dissertation Abstracts* 19: 99; No. 1, 1958.
- WHITEFORD, EMMA M. *Administrators' Stereotype of the High School Home Economics Teacher*. Doctor's thesis. Urbana: University of Illinois, 1955. 118 pp. Abstract: *Journal of Home Economics* 49: 227; March 1957.
- YOUMANS, RITA L. *Home Economics Teachers' Distribution of Time*. Doctor's thesis. Urbana: University of Illinois, 1957. 180 pp. Abstract: *Journal of Home Economics* 50: 226; March 1958.

Additional References

- BEMIS, JANE S. *Home Experiences of Ninth and Tenth Grade Michigan Pupils of Varying Abilities*. Doctor's thesis. University Park: Pennsylvania State University, 1958. 198 pp. Abstract: *Dissertation Abstracts* 19: 2936-37; No. 11, 1959.

- CAWLEY, HELEN L. *The Informal Evaluation as a Teaching Technique for Some of the Less Tangible Aspects of a Homemaking Program at the Seventh and Eighth Grade Levels*. Doctor's thesis. University Park: Pennsylvania State University, 1958. 174 pp. Abstract: *Dissertation Abstracts* 19: 129; No. 1, 1958.
- GENTRY, LOUISE. *Some Intellectual Attributes and Educational Interests of University Women in Various Majors*. Doctor's thesis. Columbus: Ohio State University, 1959. 325 pp. Abstract: *Dissertation Abstracts* 20: 4389; No. 11, 1960.
- GINGLES, RUBY H. "Personal Adjustment of College Students." *Journal of Home Economics* 50: 194-200; March 1958.
- HALL, OLIVE A. "Achievement of Superior Majors." *Journal of Home Economics* 52: 249-52; April 1960.
- LATHROP, IRVIN T. "The Effect of High School Size and Course Pattern on Achievement in College Home Economics." *Journal of Home Economics* 50: 775-77; December 1958.
- LAWS, RUTH MITCHELL. *A Study of the In-Service Education Needs of Homemaking Teachers in Delaware*. Doctor's thesis. New York: New York University, 1956. 191 pp. Abstract: *Journal of Home Economics* 49: 223-24; March 1957.
- LITTLE, AZALETE R. *Child Development in Vocational Homemaking Programs of Area VII in Texas*. Doctor's thesis. Austin: University of Texas, 1960. 161 pp. Abstract: *Dissertation Abstracts* 20: 4647; No. 12, 1960.
- SCHROEDER, FLORENCE MARGARET. *An Exploratory Study of Beliefs and Practices of Jemez Pueblo Indians of New Mexico Pertaining to Child Rearing and Pre-School Years in Relation to the Educational Status of the Mother*. Doctor's thesis. New York: New York University, 1960. 200 pp. Abstract: *Journal of Home Economics* 53: 235; March 1961.

CHAPTER V

Industrial Education

JOHN W. KARNES, JR.

RESearch in industrial education was last presented in the October 1956 REVIEW by London and Spence (1956). During the past six years, more than 500 master's and doctor's theses, most of which were summarized by Strong (1961), have been collected by the research committee of the National Association of Industrial Teacher Educators. Summaries of others are now in process of publication. Hutchcroft (1960) and Leighbody (1960) have also contributed to the review of research literature in the field of industrial education.

Rather than to attempt a review of all appropriate studies, the primary purpose here is to cover the range and variety of such studies in a selective manner. Studies are divided between industrial arts and vocational-industrial education, not because the content of material reviewed under one heading may not have implications for the other, but in order to form a basis for organizing the material in keeping with generally acceptable terminology.

Industrial Arts

Two noticeable exceptions to past trends with respect to research in industrial arts have appeared in recent years. First, there is evidence that significant research by professional workers for other than graduate-degree requirements is being undertaken. Second, research on learning with direct applications to the subject matter content of industrial arts is gaining emphasis.

Foundations

In studying the derivation and nature of generalizations made for the field of industrial arts, Lindbeck (1958) concluded that a majority of research studies were of the survey type and that, because of the trend in scientific procedures toward adjudging an hypothesis a theory only after it has undergone a validation process, there were no theories of industrial arts *per se*.

However, in the face of this moderate disclaimer by Lindbeck, Baird (1960) utilized the beliefs and theories of John Dewey to conclude that objectives of teacher education in industrial arts, based upon experimentalism, would emphasize the values of democracy, scientific method, social efficiency, and place and needs of man in our industrial society.

Further use was made of documentary sources and procedures by Biedler (1958) to investigate the recreational possibilities of industrial arts and by Wockenfuss (1960) to study sociological foundations of the field. Biedler confirmed the recreational function of industrial arts, while Wockenfuss concluded that industrial arts must continue to emphasize its generally acceptable social purposes. Opportunities for carefully designed and controlled experimental studies should not be overlooked as possibilities for giving credence to the claims made by each of these two authors.

Teacher Education

In relation to selection and success of industrial arts teachers, Scherer (1960) concluded that teachers with graduate credit were generally rated over teachers without graduate credit and that teachers usually were required to be well qualified in terms of general and professional ratings.

Powers (1961) concluded that factors other than scholastic attainment operate to produce successful industrial arts teachers, and Foss (1958) found that personal goals and attitudes were the most important elements in teaching success.

As a result of a rather comprehensive treatment of several variables, Nelson (1962) concluded the following: (a) Humaneness dictates that students be fairly and carefully selected. (b) Significant differences in interests can be measured through available tests to identify those who should be discouraged or denied admission.

In support of efforts to improve teacher education in industrial arts, Bowman (1958) emphasized the need for mathematical skills; Jelden (1960) recommended that more instruction in electricity and electronics be required; and Strickland (1959) stressed the importance of effective application of behavioral science data to instruction in industrial arts.

In an effort to help resolve a most controversial and complex problem, Wigen (1957) studied the issues and difficulties involved in offering technical courses at the graduate level and prepared a guide for developing or evaluating such courses.

For purposes of preparing industrial arts teachers and consultants for elementary schools, Gilbert (1955) emphasized the need for scientific study of children, as well as study of the organization of elementary schools and of the methods of initiating and enriching classroom activities. In its ninth yearbook, the American Council on Industrial Arts Teacher Education (1960) featured the implications of research, with particular reference to teacher education in industrial arts.

Learning

Basic research on learning with industrial arts as a locus has been practically nonexistent until recent years, during which several studies have

been reported. Previously, studies relating to this type of research tended to emphasize effectiveness of various methods with achievement as a criterion.

In a group of related studies at the same institution, Ray (1957), Grote (1960), and Rowlett (1960) carried out experimental comparisons between "direct-detailed" and "directed-discovery" methods of teaching in which different subject matter was used. Ray reported differences in favor of the directed-discovery method with respect to retention of material as determined six weeks after instruction; Grote reported findings which indicated no clear-cut superiority of either method on various combinations and sequences of treatment; and Rowlett reported general superiority of the directed-discovery method over the direct-detailed method beyond the initial learning period.

With regard to the effect of level of aspiration upon the learning of skills, Lockette (1955) reported that, in general, methods which induce subjects to set realistic levels are superior to those which induce subjects to set unrealistic levels.

Jacobsen (1957) concluded that neither competitive nor cooperative learning experiences are superior with regard to the acquisition of information or to the development of skill in technical drawing. However, tendencies in favor of cooperative learning experiences were found with respect to attitudes.

Continued research on learning as applied to the subject matter of industrial arts shows some promise of being productive.

Curriculum and Achievement

After using the *California Reading Test*, the *Otis Quick-Scoring Mental Ability Tests*, and the *SRA Primary Mental Abilities*, together with grade averages at the junior high school level, Long (1959) concluded that prediction of success in five different practical arts and vocational subjects at the high school level was only moderately effective. He suggested that any high school staff desiring to employ this type of prediction should make its own study.

In a study to evolve a formula to predict success in shop, Racky (1959) concluded that the predictive value of a battery (consisting of the *Personal Data Blank*, the *MacQuarrie Test for Mechanical Ability*, the mechanical interest scale of the *Kuder Preference Record—Vocational*, the *Kuhlmann-Anderson Intelligence Tests*, and the pupil's age in months) would not be sufficiently high to justify selection or elimination of pupils on the basis of scores obtained. His suggestion that information provided by the tests would be of diagnostic value to the teacher is much preferred over the implication that pupils would be selected or eliminated if the degree of predictive value of the regression equation had proved to be greater.

Verification of a study reported by Hawlk (1960), in which he found that students of cooperative work experience achieved at a higher estimated level than students of industrial arts in six of nine validated objectives in industrial arts, would seem to require either a drastic change in experiences in industrial arts or severe modification of objectives in industrial arts.

Medlin, Lindquist, and Schmitt (1960) described in detail polytechnic education as practiced in the general schools of the Soviet Union—an exposition which will provide some bases for comparisons with industrial arts and other practical arts education subjects in the United States.

Vocational-Industrial Education

During the period covered by this REVIEW, research concerning public vocational-industrial education programs was primarily the result of the efforts of graduate students. However, research undertaken in the armed forces, industry, and other public and private agencies has promise for improving education for occupational proficiency in production and related services.

Teacher Education

Two studies concerned with industrial teacher education at the graduate level were reported from Wayne State University. From an analysis of factors in selective retention, Benson (1959) found that doctoral students who completed all degree requirements made significantly higher scores on three standardized tests than students who were unsuccessful. His suggestion of the possibility of establishing means of using test data to provide maximum separation between successful and unsuccessful groups of students needs further study and validation. King (1959) identified seven types of research found in doctoral dissertations in industrial education, devised a check list for use prior to final submission of research, and made suggestions for a syllabus on research procedures in industrial education.

Strong (1958) suggested a national plan of cooperation among the various states in order to produce and to distribute curricular materials for trade and industrial education.

Interests and Aptitudes

One of the many studies concerning selection of students and prediction of achievement was reported by Samuelson (1958), who found that the scales on the *Kuder Preference Record* correlating highest with the criterion of student success were only moderately predictive. He suggested that usefulness of such data should be determined for specific situations. In testing

the findings of Samuelson, Motto (1959) found that none of the *Kuder Preference Record* scales significantly differentiated successful from unsuccessful trainees enrolled in 10 different programs of training.

As a result of an experimental study covering a full school at the tenth-grade level, Mendicino (1958) concluded that vocational machine shop did not have any more effect upon achievement on mechanical-reasoning test scores than did experience in nonvocational curriculums. He also made the same conclusion concerning the effect of vocational mechanical drawing on space-perception test scores.

Doppelt, Seashore, and Odgers (1959) found no indication that an effective estimate of a student's over-all success in automobile mechanics can be made from scores on the *Differential Aptitude Tests*; whereas, for machine shop students, the relationships were sufficiently high to permit useful predictions.

Ruch and Ruch (1960) used tests from the *Employee Aptitude Survey* to support the hypothesis that success in draftsman training could be predicted from short time limit aptitude tests.

Learning

Siegel, Richlin, and Federman (1960) compared the technical effectiveness of specific training with more general training in three naval aviation ratings. For the two ratings in which success depends upon mechanical ability and perceptual motor skill, no statistically significant differences were found between groups. For the third rating, in which success depends to a considerable degree on verbal behavior and abstract reasoning, the more generally trained group was superior.

The effectiveness of two methods of training aircraft mechanics was studied by Judy (1958), who found no significant difference in job knowledge held by mechanics who had received field training as compared with those who had had a more formal Air Force technical school course. Mechanics at higher levels of aptitude and experience benefited most from field training; mechanics at lower levels of aptitude and experience benefited most from technical school training.

One precaution in the application of Judy's study to other forms of industrial education and to other types of situations should be observed. To assume that the advantage held by field-trained mechanics at higher levels of aptitude would apply in programs requiring longer duration and greater applications of perceptual or verbal abilities would not be justified without further verification.

In a study which should have important implications for advanced forms of industrial education, both in school and in industry, Cline, Beals, and Seidman (1960) found that groups of Army men at each of several levels of intelligence could learn about as much cognitive verbal material in a four-week accelerated training program as groups of comparable intelligence could learn in a normal eight-week program.

Moss (1960) compared the relative effectiveness of the direct-detailed and the directed-discovery methods of teaching letterpress imposition to vocational-industrial students. He found the two methods to be equally effective for retention and for transfer, with no interaction of method and intelligence level.

Programs

Two historical studies of program development in different states have been reported. Penny (1960) traced the beginning of industrial education in Kansas to a trade program for Indians at the Shawnee Manual Labor School in 1838. He reported apprenticeship training was organized by territorial law in 1855, with schools for teaching trades organized for the blind in 1859, for the sighted in 1873, for the deaf in 1887, and for industrial teacher education in 1903.

Vocational-industrial education programs in the secondary public schools of Pennsylvania from 1900 to 1954 were traced by Fike (1956). Classes and schools developed slowly following the first vocational education acts, with early emphasis on the mineral industries.

Wilcox (1956) developed criteria appropriate for use in evaluating local programs of trade and industrial education. Evaluative practices in management education and developmental programs in industry were studied by Shafer (1961), who reported that available research techniques in evaluation are not only difficult to apply in productive situations but also inadequate.

In studying special programs, De Vore (1961) found that usefulness of graphic representations increased in both training and employment situations for the higher skill levels in production industries.

Summary

In general, research in industrial education has been characterized by documentary and descriptive procedures. Furthermore, the concept of industrial education, as revealed in the research, has been a factor in narrowing the scope of research undertaken both by graduate students and by professional workers in the field. Major studies to test the traditional organization and curricular patterns of programs have not been emphasized. Few research projects sponsored by grants from established supporting agencies have been undertaken.

On the other hand, both the techniques and the results of productive research in related disciplines and in applied fields show much promise for benefiting industrial education through appropriate applications. Research grants for projects in industrial education which are available from established agencies may be approved for projects of suitable scope and

appropriate design when qualified staff can be assigned. Task force or team efforts can be utilized to advantage to cover several facets of larger projects and/or to replicate research and to verify results.

Bibliography

- AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION. *Research in Industrial Arts Education*. Ninth Yearbook. (Edited by Raymond Van Tassel.) Bloomington, Ill.: McKnight & McKnight Publishing Co., 1960. 123 pp.
- BAIRD, RONALD JAMES. *The Application of John Dewey's Philosophy to Industrial Arts Teacher Education*. Doctor's thesis. East Lansing: Michigan State University, 1960. 265 pp. Abstract: *Dissertation Abstracts* 22: 2298; No. 7, 1962.
- BENSON, WILLARD A. *Measurable and Observable Factors in the Selective Retention of Doctoral Candidates with Special Implications for Industrial Education*. Doctor's thesis. Detroit: Wayne State University, 1959. 256 pp. Abstract: *Dissertation Abstracts* 19: 3185; No. 12, 1959.
- BIEDLER, JOHN SAMUEL. *The Recreational Function of Industrial Arts*. Doctor's thesis. Columbus: Ohio State University, 1958. 162 pp. Abstract: *Dissertation Abstracts* 19: 2292; No. 9, 1959.
- BOWMAN, JAMES E. *A Study of the Basic Mathematical Skills Needed To Teach Industrial Arts in the Public Schools*. Doctor's thesis. East Lansing: Michigan State University, 1958. 210 pp. Abstract: *Dissertation Abstracts* 19: 3226-27; No. 12, 1959.
- CLINE, VICTOR B.; BEALS, ALAN R.; and SEIDMAN, DENNIS. "Experimenting with Accelerated Training Programs for Men of Various Intelligence Levels." *Educational and Psychological Measurement* 20: 723-35; Winter 1960.
- DE VORE, PAUL WARREN. *Determination of Basic Learnings in Graphic Representations Essential to Employee Adaptation in Production Industries*. Doctor's thesis. University Park: Pennsylvania State University, 1961. 232 pp. Abstract: *Dissertation Abstracts* 22: 3920-21; No. 11, 1962.
- DOPPELT, JEROME E.; SEASHORE, HAROLD G.; and ODGERS, JOHN G. "Validation of the Differential Aptitude Tests for Auto Mechanics and Machine Shop Students." *Personnel and Guidance Journal* 37: 648-55; May 1959.
- FIKE, IRIS LINN. *Historical Development of Vocational Industrial Education Programs of Secondary Grade Level in Public Schools of Pennsylvania from 1900 to 1954*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 253 pp. Abstract: *Dissertation Abstracts* 18: 922; No. 3, 1958.
- FOSS, MAURICE FELKER. *Implications for Industrial Arts Teacher Education from Case Studies of Selected Teachers*. Doctor's thesis. Cincinnati: University of Cincinnati, 1958. 507 pp. Abstract: *Dissertation Abstracts* 19: 2288-89; No. 9, 1959.
- GILBERT, HAROLD G. *An Industrial Arts Teacher Education Program for Elementary Schools*. Doctor's thesis. Columbus: Ohio State University, 1955. 243 pp. Abstract: *Dissertation Abstracts* 16: 708-709; No. 4, 1956.
- GROTE, CHARLES NELSON. *A Comparison of the Relative Effectiveness of Direct-Detailed and Directed-Discovery Methods of Teaching Selected Principles of Mechanics in the Area of Physics*. Doctor's thesis. Urbana: University of Illinois, 1960. 355 pp. Abstract: *Dissertation Abstracts* 21: 3016-17; No. 10, 1961.
- HAWLK, ROBERT HENRY. *A Comparative Study of Estimated Achievement by Industrial Arts Students and Students of Cooperative Work Experience Selected from the Public Secondary Schools of Pennsylvania, Ohio, and Michigan*. Doctor's thesis. University Park: Pennsylvania State University, 1960. 214 pp. Abstract: *Dissertation Abstracts* 21: 1806-1807; No. 7, 1961.
- HUTCROFT, ROBERT C. "Industrial Arts." *Encyclopedia of Educational Research*. Revised edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. pp. 688-96.
- JACOBSEN, ECKHART A. *A Comparison of Competitive and Cooperative Learning Experiences in Technical Drawing on the College Level*. Doctor's thesis. Storrs: University of Connecticut, 1957. 239 pp. Abstract: *Dissertation Abstracts* 17: 2223-24; No. 10, 1957.

- JELDEN, DAVID L. *Electrical Informational Content Included in Industrial Arts Teacher Education vs. Knowledge Required of Electronic Technicians*. Doctor's thesis. Columbia: University of Missouri, 1960. 190 pp. Abstract: *Dissertation Abstracts* 21: 1470-71; No. 6, 1960.
- JUDY, CHESTER J. "Field Training Versus Technical School Training for Mechanics Maintaining a New Weapon System." *Journal of Applied Psychology* 42: 384-88; December 1958.
- KING, THOMAS G. *Fundamental Procedures of Research for Industrial Education*. Doctor's thesis. Detroit: Wayne State University, 1959. 320 pp. Abstract: *Dissertation Abstracts* 19: 3235; No. 12, 1959.
- LEIGHBODY, GERALD B. "Trade and Industrial Education." *Encyclopedia of Educational Research*. Revised edition. (Edited by Chester W. Harris.) New York: Macmillan Co., 1960. pp. 1524-29.
- LINDBECK, JOHN ROBERT. *A Framework for Research in Industrial Arts*. Doctor's thesis. Minneapolis: University of Minnesota, 1958. 172 pp. Abstract: *Dissertation Abstracts* 19: 740-41; No. 4, 1958.
- LOCKETTE, RUTHERFORD E. *The Effect of Level of Aspiration upon the Learning of Skills*. Doctor's thesis. Urbana: University of Illinois, 1955. 88 pp. Abstract: *Dissertation Abstracts* 16: 284; No. 2, 1956.
- LONG, J. ROBERT. "Academic Forecasting in the Technical-Vocational High School Subjects." *Personnel and Guidance Journal* 37: 666-68; May 1959.
- MEDLIN, WILLIAM K.; LINDQUIST, CLARENCE B.; and SCHMITT, MARSHALL L. "Polytechnic Education in the General Schools." *Soviet Education Programs*. U.S. Department of Health, Education, and Welfare, Office of Education, Bulletin 1960, No. 17. Washington, D.C.: Government Printing Office, 1960. Chapter 3, pp. 94-171.
- MENDICINO, LORENZO. "Mechanical Reasoning and Space Perception: Native Capacity or Experience." *Personnel and Guidance Journal* 36: 335-38; January 1958.
- MOSS, JEROME, JR. *An Experimental Study of the Relative Effectiveness of the Direct-Detailed and the Directed Discovery Methods of Teaching Letterpress Imposition*. Doctor's thesis. Urbana: University of Illinois, 1960. 280 pp. Abstract: *Dissertation Abstracts* 21: 2992; No. 10, 1961.
- MOTTO, JOSEPH J. "Interest Scores in Predicting Success in Vocational School Programs." *Personnel and Guidance Journal* 37: 674-76; May 1959.
- NELSON, HOWARD F. "Selection of Students in Industrial Arts Teacher Education." *Essentials of Preservice Preparation*. Eleventh Yearbook, American Council on Industrial Arts Teacher Education. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1962. Chapter 12, pp. 140-67.
- PENNY, FOREST LEE. *Origin and Development of Industrial Education in Kansas*. Doctor's thesis. Columbia: University of Missouri, 1960. 322 pp. Abstract: *Dissertation Abstracts* 21: 1449; No. 6, 1960.
- POWERS, GRADY PAT. *Relationship of Scholastic Attainment to Rated Success of Experienced Industrial Arts Teachers*. Doctor's thesis. Columbia: University of Missouri, 1961. 120 pp. Abstract: *Dissertation Abstracts* 22: 2710; No. 8, 1962.
- RACKY, DONALD J. "Predictions of Ninth Grade Woodshop Performance from Aptitude and Interest Measures." *Educational and Psychological Measurement* 19: 629-36; Winter 1959.
- RAY, WILLIS EUGENE. *An Experimental Comparison of Direct and Detailed and Directed Discovery Methods of Teaching Micrometer Principles and Skills*. Doctor's thesis. Urbana: University of Illinois, 1957. 190 pp. Abstract: *Dissertation Abstracts* 18: 459-60; No. 2, 1958.
- ROWLETT, JOHN D. *An Experimental Comparison of Direct-Detailed and Directed-Discovery Methods of Teaching Orthographic Projection Principles and Skills*. Doctor's thesis. Urbana: University of Illinois, 1960. 239 pp. Abstract: *Dissertation Abstracts* 20: 4589-90; No. 12, 1960.
- RUCH, FLOYD L., and RUCH, WILLIAM W. "Predicting Success in Draftsman Training with Short Time Limit Aptitude Tests." *Educational and Psychological Measurement* 20: 827-33; Winter 1960.
- SAMUELSON, CECIL O. "Interest Scores in Predicting Success of Trade School Students." *Personnel and Guidance Journal* 36: 538-41; April 1958.
- SCHERER, HARLAN LEONARD. *Procedures and Factors Involved in the Selection of Industrial Arts Teachers and Their Relationship to Rated Teaching Success*. Doctor's thesis. Columbia: University of Missouri, 1960. 214 pp. Abstract: *Dissertation Abstracts* 21: 2565-66; No. 9, 1961.

- SHAFER, CARL IVAN. *A Study of the Evaluative Practices in Management Education and Development Programs in Selected United States Industries*. Doctor's thesis. East Lansing: Michigan State University, 1961. 139 pp. Abstract: *Dissertation Abstracts* 22: 4245-46; No. 12, 1962.
- SIEGEL, ARTHUR I.; RICHLIN, MILTON; and FEDERMAN, PHILIPS. "A Comparative Study of 'Transfer Through Generalization' and 'Transfer Through Identical Elements' in Technical Training." *Journal of Applied Psychology* 44: 27-30; February 1960.
- STRICKLAND, THOMAS WHITNEY. *Implications of Selected Behavioral Science Data for Industrial Arts Education*. Doctor's thesis. College Park: University of Maryland, 1959. 266 pp. Abstract: *Dissertation Abstracts* 20: 3213-14; No. 8, 1960.
- STRONG, MERLE E. *An Investigation of Trade and Industrial Education Curriculum Materials Development and Curriculum Laboratories in the United States*. Doctor's thesis. Columbus: Ohio State University, 1958. 234 pp. Abstract: *Dissertation Abstracts* 19: 3240; No. 12, 1959.
- STRONG, MERLE E. *Research in Industrial Education: Summaries of Studies, 1956-1959*. U.S. Department of Health, Education, and Welfare, Office of Education, Vocational Division, Bulletin No. 293. Washington, D.C.: Government Printing Office, 1961. 148 pp.
- WIGEN, RAY ARTHUR. *Technical Offerings for Industrial Arts Teachers at the Graduate Level*. Doctor's thesis. Minneapolis: University of Minnesota, 1957. 195 pp. Abstract: *Dissertation Abstracts* 17: 1274-75; No. 6, 1957.
- WILCOX, T. GLADE. *Development of Criteria for the Evaluation of Local Programs of Trade and Industrial Education*. Doctor's thesis. Bloomington: University of Indiana, 1956. 248 pp. Abstract: *Dissertation Abstracts* 17: 84-85; No. 1, 1957.
- WOCKENFUSS, WILLIAM ARTHUR. *Sociological Bases of Industrial Arts for Secondary Schools*. Doctor's thesis. Gainesville: University of Florida, 1960. 500 pp. Abstract: *Dissertation Abstracts* 21: 2642; No. 9, 1961.

CHAPTER VI

Business Education

RAY G. PRICE

SPACE restrictions limited the number of research studies that could be included in this chapter. This necessitated establishing criteria to serve as a basis for selection. Preference, therefore, was given to research that (a) had implication for the business education program at the secondary school level or (b) contributed new information. As an inevitable consequence, many excellent studies had to be omitted.

The reader who is interested in keeping abreast of research in business education will want to refer to the spring and fall issues of the *National Business Education Quarterly* of the National Business Education Association (formerly United Business Education Association) (1957-62). The spring issues contain a list of the research completed or under way for the current year, whereas the fall issues contain abstracts of the research completed during the previous year.

Those seeking information regarding needed research in the field of business education should consult the Delta Pi Epsilon (1961) publication, *Questions To Be Answered Through Research in Business Education*.

Curriculum

In the main, evaluation studies in business education curriculum were of two types: (a) follow-up studies of graduates and (b) community surveys. Although status studies that reveal what graduates or businessmen are doing and thinking have merit as a means of improving community-school relations, they have limitations as guides to improvement of the curriculum. Since most of them reveal little that is new, often the conclusions drawn from the data are not justified.

One such study at the collegiate level was made by West (1960a), who found, by surveying graduates of a collegiate school of business, a marked correspondence between undergraduate fields of specialization and subsequent occupational history for those in accounting and in occupations pertaining to the teaching of business subjects. Majors in marketing, management, and economics, on the other hand, did not tend, to any notable degree, to be in occupations related to those fields. Except for accounting and business teaching majors, therefore, general rather than specialized business curriculums seemed to be indicated.

A good example of a community survey study is the one conducted by Wilsing (1959). Through means of a nondirective interview, opinions

were obtained from 150 businessmen in the state of Washington concerning the business education curriculum in the public high schools. Since these businessmen, representing 97 concerns, felt that, in addition to specialized business skills and desirable character traits, graduates seeking employment ought to have an elementary understanding of our economic system, the findings of this study provide one basis for appraising the secondary school curriculum in business education.

Teacher Preparation

For some time, a major concern of educators in business teaching has been how to improve preservice preparation in order to increase teacher effectiveness. Part of the answer, at least, would seem to lie in finding out exactly what teachers do in order that they might be prepared for these responsibilities. A valuable contribution in this direction was the study by Kessel (1957), who, by means of the critical-incident technique, found four major areas of business teachers' responsibility: (a) curricular planning and instructional procedures, (b) classroom management, (c) extraclass responsibilities, and (d) staff and community relationships.

In an attempt to discover preservice factors relating to business teachers' effectiveness, Polson (1961) studied 112 teachers, all of whom had been graduated from the same university within a five-year period. Out of a total of 290 statistical tests for significance of relationship, the only factor found to relate reliably to over-all effectiveness of teachers was that of persuasive interest as revealed by scores on the *Kuder Preference Record*.

If any noticeable progress is to be made in the direction of predicting teachers' effectiveness, it appears that several studies are needed, each dealing intensively with only a few factors.

Automation and Office Work

As a result of automation, the skills and knowledges needed by office workers are undergoing change. As more and more of the routine work becomes mechanized, for example, the demand for unskilled clerks will decline. This upgrading of office work should be reflected in the type of preparation provided. Evidence to support this contention may be found in a study made by the U.S. Department of Labor, Bureau of Labor Statistics (1960). The same study also reveals that in spite of a steady increase in the use of modern, automated equipment, the demand for office workers is on the rise. This is borne out by the fact that the percentage of increase in the clerical labor force during recent years has been greater than in the labor force as a whole.

Implications of the emerging electronic office for business training programs at the collegiate and secondary level are carefully set forth by

Frisbie (1960) in an ambitious study of data processing and its relationship to office employment and costs.

Basic Business and Economic Education

In the basic business program at the high school level, which consists of courses in general business, economic geography, consumer problems, business law, and principles of business, the development of economic understanding is being emphasized to a greater extent than heretofore.

Some shortcomings of the basic business program were uncovered by Jelley (1958), whose study of understandings of money management by high school seniors revealed noticeable deficiencies in their knowledge of credit and life insurance.

One obvious way of strengthening the basic business program is for professional educators to devote more time and attention to basic business in the preservice preparation of high school business teachers. At least one timely study leads to this conclusion. Jones (1960) discovered the following: (a) Most high school business teachers prefer to teach the skill subjects rather than the basic business subjects. (b) Undergraduate programs of business teacher education place greater emphasis upon preparation for teaching skill subjects than upon preparation for teaching basic business subjects. (c) Business teachers who teach or who have taught basic business subjects have a more favorable attitude toward teaching basic business subjects than teachers who do not teach or have not taught basic business subjects.

Bookkeeping and Accounting

The evidence appears to be rather conclusive that high school bookkeeping is the best predictor of success in college accounting. From the data of 128 college men and women enrolled in the first quarter of principles of accounting, Larsen (1957) developed four multiple-regression equations, using the following as predictive factors: sex; age; veteran status; size of high school attended; rank in high school class; size of senior class; cumulative high school average; previous study of bookkeeping; grade point average during first quarter in college; grades in college freshmen composition, business mathematics, and introduction to business; and college entrance test scores. The equations were then applied to a group of 106 first-quarter accounting students the following year. The findings indicated that high school bookkeeping was the only significant predictor of achievement in college accounting. Students who had taken bookkeeping in high school did consistently better in college accounting than those who had not had a bookkeeping course in high school.

Clerical Practice

Studies pertaining specifically to clerical practice that met the selective criteria appeared to be practically nonexistent. Except for those reported in the section of this chapter on automation and office work, only one was thought to have implications for this area of business education. Kilbledge (1959), working for a mail-order house, devised a system of learning curves to predict the learning time on repetitive clerical operations. Even though the analysis was based on only eight test operations and three verification operations in one type of business, the design could be used for studies of other on-the-job skill learnings.

Stenography

From the standpoint of both quantity and quality, the stenographic area was a favored one for research in business education during the years covered by this REVIEW.

Probably since the invention of shorthand, syllabic intensity has been commonly regarded as the most important factor contributing to the variation in difficulty of shorthand dictation materials. This belief was challenged by Hillestad (1960), who demonstrated that word frequency is a much more reliable measure of difficulty than is syllabic intensity. In addition, the multiple-regression technique used for the study made possible the development of an equation to predict the number of errors students are likely to make in their shorthand notes when taking dictation.

By means of time-study techniques, Jester (1959) discovered pertinent information about the transcription process. Of particular consequence to shorthand teachers was that nontypewriting activities of transcription, such as erasing, deciphering poor shorthand notes, proofreading, and dealing with spelling problems, were of more importance with regard to time than the typewriting activity. In fact, of the over-all transcription time, only 38 percent was devoted to the typewriting activity, whereas 62 percent was devoted to nontypewriting activities.

Investigating the relationship between competency in shorthand vocabulary and achievement in taking dictation, Danielson (1959) found that as a student's shorthand vocabulary index increased, his rate of taking dictation also increased. Shorthand vocabulary, however, is not the only factor in dictation ability. It is interesting to note that, although general scholastic ability was found to be only remotely related to shorthand vocabulary ability, a substantial degree of correlation was found between shorthand dictation achievement and general scholastic ability.

Two studies with applications for those preparing stenographers dealt with actual business correspondence practices. Stather (1960) compiled a list of 99 punctuation rules and analyzed their use in modern business correspondence. It was discovered that 27 of the 99 rules represented 97

percent of all punctuation marks used in the correspondence analyzed. Lis (1961) obtained items of disputable English usage and then screened secretarial handbooks for statements concerning those items. Forty-four such items were submitted to the committee on English usage of the National Council of Teachers of English for comments concerning their current status in American English usage. In private interviews, 50 business executives and 50 secretaries were asked to indicate their acceptance or rejection of these disputable-usage items in sentences read to them. Although the secretarial handbooks almost universally condemned their usage, the businessmen and their secretaries only rated 10 items as disputable, accepted 29, and rejected 5. The consistency of their responses was verified by examining a random sampling of letters from the files of each participant. Lis recommended that "the English usage sections of the secretarial handbooks be revised to reflect the contemporary linguistic approach to language study and usage."

Typewriting

Perhaps the most striking body of recent evidence on typewriting instructional material concerns the traditional practice of devoting substantial amounts of time to building ordinary copying skill and to evaluating typists on that basis. Crawford (1956) demonstrated experimentally that students who spend their time on production typing not only achieve a higher production rate than those who devote the major amount of time to ordinary copying practice but also do just as well on straight copying. Christensen (1956) found that ordinary copying practice done by employed typists does not significantly increase their actual on-the-job output. West (1960b) has demonstrated, through correlational analysis, a low relationship between straight copying skill and job-type activities.

Bell (1960) found that whether the sequence of learning activities in beginning typewriting was constant or varied had no significant effect on students' achievement or attitudes.

Conclusion

According to Himstreet (1958), approximately 90 percent of the business education studies completed within a recent five-year period were descriptive surveys for which the questionnaire and library methods of gathering data were used. Yet the worth of new ideas cannot be established except by rigorous experimentation. The future growth and improvement of business education, therefore, lies not in more research, but in research experimentally oriented. In addition, better use of what past research has revealed needs to be made.

Bibliography

- BELL, R. DERMONT. *The Effect of Varying the Sequence of Learning Activities in Beginning Typewriting*. Doctor's thesis. Los Angeles: University of Southern California, 1960. 175 pp. Abstract: *Dissertation Abstracts* 21: 2157-58; No. 8, 1960.
- CHRISTENSEN, OPAL. *The Value of Speed-Forcing Drills Administered at the Work Station in Improving Typewriting Proficiency and Production*. Doctor's thesis. New York: New York University, 1956. 182 pp. Abstract: *Dissertation Abstracts* 17: 520; No. 3, 1957.
- CRAWFORD, THOMAS JAMES. *The Effect of Emphasizing Production Typewriting Contrasted with Speed Typewriting in Developing Production Typewriting Ability*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 405 pp. Abstract: *Dissertation Abstracts* 16: 2401-2402; No. 12, 1956.
- DANIELSON, HARRIET ANN. *The Relationship Between Competency in Shorthand Vocabulary and Achievement in Shorthand Dictation*. Doctor's thesis. Bloomington: Indiana University, 1959. 153 pp. Abstract: *Dissertation Abstracts* 20: 3662; No. 9, 1959.
- DELTA PI EPSILON. *Questions To Be Answered Through Research in Business Education*. Research Bulletin No. 1. Denver: University of Denver, 1961. 11 pp.
- FRISBIE, MARY ADELE. *Emerging Electronic Data Processing and Its Relation to Office Employment and Costs, 1930-1957, and Implications for Business Training*. Doctor's thesis. New York: New York University, 1960. 640 pp. Abstract: *Dissertation Abstracts* 22: 1051; No. 4, 1961.
- HILLESTAD, MILDRED C. *Factors Which Contribute to the Difficulty of Shorthand Dictation Material*. Doctor's thesis. Minneapolis: University of Minnesota, 1960. 292 pp. Abstract: *Dissertation Abstracts* 21: 3359-60; No. 11, 1960.
- HIMSTREET, WILLIAM C. "Analysis and Criticism of Research in Business Education, 1952-1956." *Balance Sheet* 40: 148-50; December 1958.
- JELLEY, HERBERT M. *A Measurement and Interpretation of Money Management Understandings of Twelfth-Grade Students*. Doctor's thesis. Cincinnati: Teachers College, University of Cincinnati, 1958. 289 pp. Abstract: *Dissertation Abstracts* 19: 2295; No. 9, 1958.
- JESTER, DONALD D. *A Time Study of the Shorthand Transcription Process*. Doctor's thesis. Evanston, Ill.: Northwestern University, 1959. 144 pp. Abstract: *Dissertation Abstracts* 20: 3597; No. 9, 1959.
- JONES, RAYMOND L. *Relationships Between Certain Background Factors of Selected Business Teachers and Attitudes Toward Teaching Basic Business Subjects*. Doctor's thesis. Gainesville: University of Florida, 1960. 188 pp. Abstract: *Dissertation Abstracts* 21: 2613-14; No. 9, 1960.
- KESSEL, ROBERT M. *The Critical Requirements for Secondary School Business Teachers Based upon an Analysis of Critical Incidents*. Doctor's thesis. Madison: University of Wisconsin, 1957. 236 pp. Abstract: *Dissertation Abstracts* 17: 816; No. 4, 1957.
- KILBREDE, M. D. "Predetermined Learning Curves for Clerical Operations." *Journal of Industrial Engineering* 10: 203-209; May-June 1959.
- LARSEN, TORA M. *A Study of the Student Personnel Records at East Carolina College as Relates to Prediction in Elementary Accounting*. Doctor's thesis. Minneapolis: University of Minnesota, 1957. 404 pp. Abstract: *Dissertation Abstracts* 18: 1304; No. 4, 1958.
- LIS, ANTHONY S. *Attitudes and Practices of Executives and Secretaries Concerning Disputable Items of English Usage in Secretarial Handbooks: A Study Made in the Oil Industry in Tulsa, Oklahoma*. Doctor's thesis. Minneapolis: University of Minnesota, 1961. 294 pp. Abstract: *Dissertation Abstracts* 22: 1988-89; No. 6, 1961.
- NATIONAL BUSINESS EDUCATION ASSOCIATION (formerly United Business Education Association). *National Business Education Quarterly*. Washington D.C.: the Association, a department of the National Education Association, 1957-62. Vol. 26, 72 pp.; Vol. 27, 80 pp.; Vol. 28, 72 pp.; Vol. 29, 72 pp.; Vol. 30, 64 pp.
- POLSON, JAMES PERRY. *Pre-Service Factors Contributing to the Effectiveness of Business Teachers*. Doctor's thesis. Los Angeles: University of Southern California, 1961. 212 pp. Abstract: *Dissertation Abstracts* 21: 3370; No. 11, 1961.
- STATHER, DONALD G. *The Application of the Rules of Punctuation in Typical Business Correspondence*. Doctor's thesis. Boston: Boston University, 1960. 208 pp. Abstract: *Dissertation Abstracts* 21: 1876; No. 7, 1961.

- U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Adjustments to the Introduction of Office Automation*. Bulletin No. 1276. Washington, D.C.: Government Printing Office, May 1960. 86 pp.
- WEST, LEONARD J. *A School of Business Surveys Its Alumni—1949-1958*. Independent study. Carbondale: Southern Illinois University, 1960. 171 pp. Summary: *Southern Illinois Business Bulletin* 10: 1-12; Fall 1960. (a)
- WEST, LEONARD J. "Some Relationships Between Straight-Copy Typing Skill and Performance on Job-Type Activities." *Delta Pi Epsilon Journal* 3: 17-27; November 1960. (b)
- WILSING, WESTON C. *An Appraisal of Business Education in the Urban and Rural Public High Schools of the State of Washington*. Doctor's thesis. Seattle: University of Washington, 1959. 443 pp. Abstract: *Dissertation Abstracts* 20: 971; No. 3, 1959.

CHAPTER VII

Distributive Education

HARLAND E. SAMSON

THIS ISSUE of the REVIEW marks the first time that an entire chapter has been devoted to distributive education. The rate of growth of research in distributive education has accelerated rapidly, so much so that the material to be reviewed for the past six years appears to exceed the total of all prior years.

Many studies, especially those carried out at the master's level, are of the normative-survey type. They are important, largely, only to the local community surveyed, for such research tends deliberately to limit its scope to localized populations. Inferences to other communities cannot readily be drawn.

The doctoral research ranges from literature and simple questionnaire studies to research using more sophisticated and substantial statistical techniques. Most encouraging is the amount of independent research reported by instructional and supervisory personnel. Unfortunately, since most are in mimeographed form and not generally available, they are not reviewed here.

In the survey of research by Larson (1961) of the 330 studies completed or under way, 70, or 21 percent, were community or occupational surveys. The distribution of research in other areas was somewhat more scattered. Studies in post high school programs, adult education, facilities, cost, legislation, guidance, and methods of evaluation together accounted for only 12.7 percent of the research reported. Concentration of studies on community surveys and instructional material was noticeable in the reviews of literature by Jones (1957) and Vogeley (1958).

Objectives and Philosophy

A review of emerging philosophy in distributive education was presented by Brown and Logan (1956). Agreement of objectives with actual programs in New York was investigated by Gradoni (1957). Practices and characteristics of distributive education programs in Pennsylvania were studied by Jones (1957). Although program objectives were usually found to exist in some form, generally they were broadly stated and difficult to interpret in specific terms.

Warmke's (1960) study of issues in distributive education presented a comprehensive treatment of what the leadership believes concerning current issues. The study accomplished three objectives: (a) description of current issues in distributive education, (b) identification of leaders in

the field, and (c) survey of the opinion of these leaders on the issues. The responses of the 57 leaders undoubtedly constitute a reflection of their philosophy concerning distributive education. It is interesting to note that there was 50 percent or more agreement on 79 percent of the issues and 67 percent or more agreement on 42 percent of the issues. Such levels of consensus would seem to indicate a high degree of consistency in program operation across the country. The comments of various leaders reported in this study would prove interesting to those who are trying to find a rationale for various points of view in distributive education.

Organization and Administration

The organization and administration of cooperative part-time distributive education programs in high school have been investigated to some extent by several researchers. Gradoni (1957) found that one especially weak area in cooperative and distributive programs was the management and administration of the training station. He encouraged making the real outcome of distributive education adhere more closely to what was maintained for it. In order to evaluate program practices, Jones (1957) used four groups: (a) school administrators, (b) cooperating merchants, (c) local coordinators, and (d) students. Extent of agreement on identical questions was estimated from correlation coefficients that were calculated from rank-order sets of scores expressed by each group. Merchants' responses, when paired with other groups, produced the highest negative correlations. The responses of other groups were correlated to a moderate positive degree. Hampton (1960) also reported this tendency of merchants to view programs differently from students or educators.

Curriculum and Instruction

The development of curriculum in the distributive education field has been largely the result of courses, subjects, and topics thought necessary by teachers who relied upon their own experiences in one or more distributive occupations. Job-analysis techniques are often used at the local level to determine what individual students should be receiving in preparation for specific jobs. A major reference to instructional material was published by the University of Texas (1957-61).

Broad, comprehensive studies of needs in total curriculum for preparing distributive workers at the secondary level have not been carried out. The lack of such studies makes the soundness of some areas of distributive education suspect. The U.S. Department of Health, Education, and Welfare, Office of Education (1960) prepared a report which reviewed existing curriculums and current opinions on curricular development. Although this report does not give a suggested curriculum, it does provide a concept

for curricular planning. The feeling is that the nature and effectiveness of the curriculum in secondary distributive education will depend upon the degree to which its basic concepts are incorporated into the philosophy held by school faculty, administrators, and the business community.

Curriculums are often evaluated by a follow-up procedure which attempts to determine whether what was offered was suitable. Corbman (1958), who performed such a study on graduates of a technical institute, found that the curriculum offered achieved the objectives set for it. He found that no essential differences existed between graduates' duties and responsibilities as enumerated.

Donaldson (1958) found in his evaluation of programs in Illinois that those units of instruction most closely connected with what students were currently doing were ranked as being most important. Units dealing with knowledge or skills needed in the future did not receive high ratings.

Evaluation and Follow-Up

One of the major additions to the evaluative literature in distributive education was the inclusion of Section D-5, "Distributive Education," in the 1960 *Evaluative Criteria*, published by the National Study of Secondary School Evaluation (1960). This section was analyzed, and clarification of its terminology was presented in a paper edited by Meyer (1961). This effort was a first big step in making D-5 functional, but well illustrates the need for further consensus on terminology before the instrument can be totally functional.

Simmons (1961) found that awareness of the status of adult occupations may be occurring as early as the middle elementary school years for boys and possibly during junior high school years among girls. His findings also indicated that boys and girls may acquire knowledge of adult occupations through different means. If goal acquisition should parallel the awareness of occupations found by Simmons, then distributive educators should introduce some marked changes in making job information available to youth and even in selecting students for distributive vocational education.

Mason (1961) analyzed Illinois' distributive education programs by checking occupational performance and work histories of graduates in distributive education who had worked five years against a comparable group of nondistributive education students. In general, there was no significant difference between the groups; yet, on individual factors such as responsibility, judgment, and maturity, the distributive education students were favored. Replication of the study in other geographic areas would be valuable. Mason found that he was able to reach only about 33 percent of the students after five years, largely because of the inadequate student personnel records in the school. Following a graduating class year

by year, beginning immediately upon graduation, would obviously provide a larger respondent group.

Suggested Future Research

One area of research noticeably missing is that dealing with teacher education specifically pointed toward distributive personnel. In addition to the desirability for research into preparation of teacher-coordinators, there would seem to be merit in research concerning training requirements for teachers and supervisory personnel in adult distributive education, as well as for research personnel in distributive education. The need for special teachers, as suggested by Conant (1961), would seem to make the advisability for research in teacher education even more pressing. In light of the increasing number of individuals to be trained in distributive education, research in this area should be treated with increasing vigor.

Bibliography

- BROWN, T. CARL, and LOGAN, WILLIAM B., editors. "Fifty Years of Progress in Distributive Education." *American Vocational Journal* 31: 57-59, 111; December 1956.
- CONANT, JAMES B. *Slums and Suburbs*. New York: McGraw-Hill Book Co., 1961. 147 pp.
- CORBMAN, BERNARD P. *An Evaluation of the Retail Distribution Curriculum of a Technical Institute Based upon the Work Experience of Its Graduates*. Doctor's thesis. New York: New York University, 1958. 348 pp. Abstract: *Dissertation Abstracts* 18: 2075; No. 6, 1958.
- DONALDSON, LEROY J. *An Evaluative Study of Federally Reimbursable Part-Time Cooperative Distributive Education Programs in the Public Secondary Schools of Illinois*. Doctor's thesis. Iowa City: State University of Iowa, 1958. 466 pp. Abstract: *Dissertation Abstracts* 18: 2014; No. 6, 1958.
- GRADONI, ETTORE JOHN. *A Survey of Selected Distributive Education Programs in New York State: A Study of Specific Cooperative Part-Time Retailing Programs Based on Personal Visitation and Observations at Schools and Training Stations*. Doctor's thesis. New York: New York University, 1957. 221 pp. Abstract: *Dissertation Abstracts* 17: 1714; No. 8, 1957.
- HAMPTON, ROBERT EDWIN. *Perceptions of Retailers and Retail Educators Toward Collegiate Retail Education in the California State Colleges*. Doctor's thesis. Palo Alto, Calif.: Stanford University, 1960. 225 pp. Abstract: *Dissertation Abstracts* 21: 2945; No. 10, 1961.
- JONES, GALEN VICTOR. *Practices and Characteristics of the Federally Supported, Cooperative Distributive Education Program in Pennsylvania, 1955-1956*. Doctor's thesis. Philadelphia: Temple University, 1957. 222 pp. Abstract: *Dissertation Abstracts* 17: 780; No. 4, 1957.
- LARSON, ROGER A. *A Survey of Research in Distributive Education*. Plan B paper. Minneapolis: University of Minnesota, 1961. 95 pp.
- MASON, RALPH E. *An Analysis of Related Instruction for Cooperative Part-Time Programs in Distributive Education in Illinois*. Doctor's thesis. Urbana: University of Illinois, 1961. 242 pp. Abstract: *Dissertation Abstracts* 22: 3549-50; No. 10, 1962.
- MEYER, WARREN G., issue editor. "Evaluative Criteria." *Business Education Forum* 15: 10-25; April 1961.

- NATIONAL STUDY OF SECONDARY SCHOOL EVALUATION. "Distributive Education." *Evaluative Criteria*. 1960 edition. Washington, D.C.: the Study, 1960. Section D-5, pp. 93-100.
- SIMMONS, DALE D. *The Development of Concepts About Occupational Status*. Doctor's thesis. Eugene: University of Oregon, 1961. 168 pp. Abstract: *Dissertation Abstracts* 22: 2066-67; No. 6, 1961.
- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION. *A Study of Curriculum Development in the High School Cooperative Program*. Vocational Division, Bulletin No. 281, Distributive Education Series No. 28. Washington, D.C.: Government Printing Office, 1960. 22 pp.
- UNIVERSITY OF TEXAS, DISTRIBUTIVE EDUCATION DEPARTMENT. *Texas Distributive Education Bibliography*. Austin: the University, 1957-61, 1957, 134 pp.; 1959, 210 pp.; 1961, 186 pp.
- VOGELEY, JANE JONES. *A Comparative Study of Distributive Education and Non-Distributive Education High School Graduates*. Doctor's thesis. Charlottesville: University of Virginia, 1958. 237 pp. Abstract: *Dissertation Abstracts* 19: 1259; No. 6, 1958.
- WARMKE, ROMAN F. *Distributive Education Issues in 1959: A Study of Current Distributive Education Issues, Based upon Opinions of Education Leaders*. Doctor's thesis. Minneapolis: University of Minnesota, 1960. 270 pp. Abstract: *Dissertation Abstracts* 21: 822-23; No. 4, 1960.

CHAPTER VIII

Technical Education

M. RAY KARNES

TECHNICAL education, while not new, has only recently achieved prominence as a major facet of the educational enterprise. This is a rapidly changing, complex field in which the literature is nebulous and the terminology confusing. The purposes and the distinguishing characteristics of technical education are only beginning to emerge.

While the definition of technical education presented by Harrington in the first report on research in this field to appear as a chapter in the REVIEW (October 1956) is a good one, two significant changes have occurred with reference to the term: (a) it has been broadened in its meaning to encompass programs designed to prepare technicians and semiprofessional personnel in many fields in addition to those that are engineering-related; and (b) there is now more general acceptance of the view that technical education belongs at the post high school level, from the standpoints both of age and maturity of the student and of the difficulty and complexity of the instruction. However, whether technical education should be considered an integral phase of higher education remains a major issue.

The failure to develop programs which prepare a larger number of technicians and semiprofessional personnel to supplement the number of professionals needed has been identified as a major void in the total educational system. Recent events suggest that efforts to fill this void will represent one of the significant developments in American education. Therefore, the major criterion considered in the selection of research for review in this chapter was that of significance to the problem of institutional and program planning for this emerging phase of education. Only major studies were selected for review. Most of them were conducted by people who are neither directly involved in, nor primarily concerned with, technical education.

Assessment of Basic Need

To anticipate that research can reveal with precision the need for technical education, in terms of either the number of technicians who will be needed in each of the many newly evolving occupations or the number of people who will be seeking preparation for employment in such occupations, is to ask too much of research. This is the case, whether the concern is with need on a national, state, or local level. However, the studies of

manpower demand and of the factors affecting employment and economic growth are basic to the problem of assessing need.

National Manpower Demand

One particular report issued by the U.S. Department of Labor (1960) provided in convenient form an overview of the entire manpower demand as projected for the 1960's. Data from the past and projections for the future were drawn from studies conducted by the U.S. departments of Labor; Commerce; Agriculture; and Health, Education, and Welfare. Among the projections reported which have important implications for technical education, and for education in general, are the following: (a) While the total labor force will increase 20 percent between 1960 and 1970, the category of employment with the highest educational demand—professional and technical—will increase at a faster rate (42 percent) than will any of the other eight occupational classifications. (b) Within this category, the heaviest demand will be for scientists, engineers, and technicians.

A study conducted by the U.S. Department of Labor, Bureau of Labor Statistics (1961) for the National Science Foundation provided data and projections with reference to the long-range demand, 1959-1970, for scientific and technical personnel by specific occupations, by selected industries, by the total civilian economy, by universities, and by government. This study is important from two standpoints: (a) It is a methodological one, and the descriptions and evaluations of alternative procedures for making projections and assessing need should result in increased precision in this type of research. (b) Even though it focused on the demand for scientific and technical personnel with four years or more of college work, the study included the projected demand for technicians in certain occupations for which a shorter period of post high school preparation is deemed adequate. If it can be assumed, as many students of the manpower problem have suggested, that effective utilization of a given number of professional and scientific personnel is dependent upon the services and support of a greater number of technicians and semiprofessionals, this report affords at least a rough approximation of the future national demand for technicians and semiprofessional workers. Thus it suggests something of the magnitude of the educational task involved in preparing students.

Additional References: David (1960); Ginzberg (1958); U.S. Department of Labor, Bureau of Labor Statistics (1959).

Education and Economic Growth

While of little direct value in assessing the need for technical education in specific occupations, the research conducted only quite recently by certain economists has important implications that are fundamental to the

problem of relating education to (a) the lifetime earning power of the individual and (b) increased production and economic growth within the total economy. Examination of the relationship between education and growth in the total economy represents a new venture in economic research. Johns and McLure presented an excellent summary of this research in the October 1961 issue of the *REVIEW*. Groves (1961) also summarized recent studies of the relationship of education to economic growth.

Caution should be exercised in attempting to evolve a basis for technical education from the research recently conducted by economists. Their measure of education was by level and number of years of formal schooling, not by type. Perhaps the next step is to explore the economic influence of education purposely committed to augmentation of economic efficiency.

Research and Institutional Planning

Concern about population pressures and such problems as economic growth, national security, technological change, manpower demands, and unemployment apparently has led to the recent increase in research and survey activity in connection with planning to meet the mounting demand for education beyond high school. This same concern has influenced the choice of data collected and the recommendations submitted.

State-Wide Studies of Post High School Education

Hollis, Land, and Martorana (1961) reported that during the years 1957-1960, there were 59 legislative enactments relating to various types of higher education studies in 25 states, in addition to the ones in which studies had been previously initiated. Martorana and Messersmith (1960) identified 153 state-wide and interinstitutional studies which were either completed or in process during 1956-1959, as compared with the 49 initiated or completed during 1950-1955. The junior college was included in 61 of the 153 higher education studies. Ten additional studies were concerned primarily with either the junior college or the vocational-technical institute. While not indicated by Martorana and Messersmith, an examination of the reports available from the 153 studies revealed that, even in cases in which the studies were limited to four-year college and university development, the need for technical programs of less than four years duration was almost invariably identified and stressed. The frequency with which the expression, "education beyond the high school," replaced "higher education" seemed to be significant.

Estimates were made for additional facilities for technical programs through 1970 in each of the economic areas of the state in the study of higher education conducted by the University of the State of New York, State Education Department (1957). Several factors, excluding the possibility of an increase in the proportion of high school graduates seeking

further education, were taken into account to arrive at an estimate that 16 percent of the high school graduates of the state should be enrolled as full-time students in two-year technical programs. For the state as a whole, the study showed that public facilities for technical education would need to be expanded by 1970 to accommodate 50,500 full-time students in addition to the 12,900 for which there was capacity in 1955. The report also revealed that the plans for expansion which had been projected by the various institutions of the state through 1970 would, if implemented, fall short of meeting the state's need for technical education to the extent of space for 34,000 full-time students. The study included a recommendation to the effect that the need for technical education might be met either in separate technical institutes or in comprehensive two-year community colleges. Since 1957, New York has moved rather rapidly toward the comprehensive institution in the heavily populated areas of the state.

Additional Reference: California State Department of Education (1957).

State-Wide Studies of Vocational and Technical Education

Perhaps the most significant state-wide study of vocational and technical education from the standpoint of procedures employed, data reported, and bold plans for meeting the need as assessed was conducted in Illinois by McLure and others (1960). Although many interviews and conferences were held with representatives of various groups interested in technical education, the findings, conclusions, and recommendations were derived from basic data with reference to the following: (a) population trends, mobility, and centers of concentration; (b) current educational opportunities and scholastic enrollment trends; (c) occupational patterns; and (d) economic activity and business and industrial trends.

After taking into account the proposition of the total demand for technical education which might be met by industry and the existing private and public educational institutions of the state, the Illinois study group found that, in order to satisfy a conservative estimate of the unmet needs, new and expanded publicly supported institutions would have to enroll the following numbers by 1965: (a) approximately 14,500 full-time and 12,500 part-time students in post high school technical curriculums and (b) 43,000 full-time and 40,000 part-time students in semitechnical curriculums. These enrollments were distributed among the 54 curriculums in accordance with the demand for each projected in Illinois to 1965. After considering various alternatives and taking into account the total educational demand in Illinois, the study group recommended that (a) the establishment of a state-wide system of large, regional, comprehensive-type two-year colleges be effected as the means of meeting the technical and other compelling educational needs; (b) each of the 10 regions proposed for the state have a total population not less than 500,000; (c) within each region, the major instructional facility be located near the place of greatest

population concentration and that, depending upon distances and population distribution, two or three extension centers or branches of the central institution of the region be provided; (d) each region have its own governing board; and (e) the major financial support come from state sources. A clear distinction was made between vocational education appropriate at the high school level and technical education at the post high school level. For the former, since this work to be effective and comprehensive also requires a large population base for each instructional center, the study group recommended a network of large-area or regional vocational schools, each to provide those extensive offerings needed that could not be provided by the small high schools in the regions.

The study conducted by Flesher and others (1958) for the Oregon State Board of Education, while quite comprehensive, differed considerably from the one carried out in Illinois, in that heavy dependence was placed upon a variety of questionnaire techniques in assessing need for vocational and technical education in Oregon. A much greater proportion of the total research effort was committed to evaluation of existing programs than to projecting need for further development of technical education in the state. The major recommendation was that post high school technical education be provided through branches of existing four-year institutions and administered through the state's system of higher education.

Since California has more than 50 percent of the nation's total junior college enrollment and has in its two-year institutions approximately three-fourths of the freshmen and sophomores of the state who attend publicly supported institutions, and since the major responsibility for post high school technical education has been placed clearly and emphatically upon the junior colleges of the state, the study reported by Wood (1959) should have been important from the standpoint of research findings and conclusions concerning technical education in the California junior colleges. In a report of 122 pages, however, Wood used only two tables to present all of the data collected with reference to technical curriculums in the 30 junior colleges which were offering such work. The other 32 publicly supported junior colleges in the state were found to be offering no technical programs as defined in the study. Examination of catalogues was the procedure employed. Wood noted that, of the 17 curricular groups listed, 16 colleges were offering electronics; 17, engineering technology; and 8, drafting technology. He also mentioned that no other program was offered by more than 5 colleges.

The range of total semester-hour requirements in all programs and all institutions was not large: 60-71. However, the requirements within programs varied greatly: science courses, 0-30; courses in major field, 4-40; related technical courses, 2-36; general education courses, 7-17; and electives, 0-23.

The significance of the California report, suggested by its subtitle, lies in the fact that it provided a review of technical education developments of the past, brought together and interpreted policy statements bearing

upon technical education in the junior college, and suggested in considerable detail the guidelines for planning, operating, and evaluating technical education programs. Instruments for data collection were also presented.

Regional and Local Studies

Far more numerous than the state-wide studies were the local and regional surveys. Some were rigorously conducted, and they should be of critical importance to the existing and proposed institutions directly affected. They contributed little, however, to the state-wide and national planning which seems to be essential to meeting effectively on a broad scale the demand for technical education. Typically, they were carried out in connection with junior college developments. The study conducted in Michigan by the Citizens Advisory Council (1960) is a good example.

Curriculum

One of the most difficult problems in the area of technical education is that of constructing courses and curriculums. The study reported by Brandon (1958) represented the most important contribution of the past six years with reference to curricular research in this field. Variations of the instruments and of the procedures Brandon evolved have been employed in many of the surveys conducted subsequent to the distribution of his report.

Additional References: Brandon (1960); Stewart and Workman (1960).

Enrollment

Technical Education News has, in past years, reported enrollments in engineering-related technical curriculums. The U.S. Office of Education now provides a much more complete enrollment picture for all organized occupational curriculums offered in post high school institutions. Brunner and Morrison (1961) reported that 43,191 students graduated from such curriculums in 1957-58, as compared with 12,985, a decrease of 2.5 percent over the previous year, from engineering-related programs. For those who enjoy making comparisons with a country heavily committed to education at all levels and of all types, it may be interesting to note that DeWitt (1961) reported that Russia graduated 540,000 from semiprofessional schools in all fields in 1959.

Programs and Institutions

Three studies were selected to be reviewed below because of their identification and treatment of problems and because of their implications for

the development of institutions in which technical programs might be successfully pursued. All three, supported by the Carnegie Corporation of New York, were both descriptive and evaluative.

The Technical Institute

The study directed and reported by Henninger (1959) was started in 1954 as a major project of the Technical Institute Division of the American Society of Engineering Education. The purposes of the study were clearly defined. Its sponsorship explains why the study was limited to programs designed to prepare engineering technicians and to institutions which offer such programs.

Data were collected from 121 of the 144 institutions identified in the United States as offering programs for engineering technicians in 1958. While the terms, "technical institute" and "technical institute education," were used throughout the report, only 44 of the 121 institutions studied were separate technical institutes. Of these, 20 were privately owned; 16, privately endowed; and 8, publicly supported. The remaining 77 included 13 private colleges and universities, 18 public colleges and universities, and 46 public and private junior colleges. Comprehensive questionnaires were executed at the 121 institutions, and personal interviews were held at 90 of them. In addition, 140 employers of technical personnel were interviewed in 25 states. Henninger reported data pertaining to (a) the curriculum, (b) the student body, (c) the faculty, (d) the physical plant, (e) the administrative patterns, (f) the financial structure and cost, and (g) the engineering technician in employment.

Reported in tabular form, the data were subjected to little statistical treatment, analysis, or comparison. Interpretation of tables and extent of summation of major findings were limited. Conclusions were not clearly set forth in the report. A bias in favor of curriculums approved by the Engineering Council for Professional Development was apparent. Many evaluative statements suffered from lack of supporting evidence. Nevertheless, the study is important for having revealed the wide variations in programs in operation; the conflicting points of view; the problems and issues which beset the field; the multitude and range of curriculums; the types of institutions offering technical education in engineering-related areas; and the distinctions to be made between technical curriculums and (a) vocational offerings at the trade level, (b) traditional academic offerings, and (c) the first two years of professional curriculums.

Additional Reference: Smith and Lipsett (1956).

Technical Education and the Junior College

The frequency and fervor with which lay and professional groups assign major responsibility for technical education to the comprehensive two-year

college added special significance to the study reported by Medsker (1960). Several technical institutes and two-year branches of senior colleges were included in his depth study of 76 of the 342 public and private two-year institutions located in the 15 states having 76 percent of the nation's two-year college enrollment. He concluded that the two-year college, in spite of its avowed purposes and the high expectations for it, could not support its claim to uniqueness on the basis of special services rendered the two-thirds of the students who do not go beyond the second year of college.

Though not central to the purposes of the study, Medsker identified and treated objectively the major problems to be overcome in developing technical education on a broad scale, whether this is to occur in the comprehensive two-year college or in some other institution. Among these were (a) the culturally induced prestige and social values associated with conventional college work, (b) inadequate counseling services and lack of information concerning technical education possibilities, and (c) honest disagreement among faculty members and employers as well concerning what constitutes the best preparation for semiprofessional occupations. Medsker concluded his analysis of the problems with the observation that if preparation for mid-level occupations is to be of increasing importance, the comprehensive two-year college is the logical institution to provide the training. He acknowledged, however, that failure of the comprehensive two-year college to do so, as unfortunate as this might be, would leave no alternative but to turn to another type of institution.

Clark (1960) utilized the intensive case approach to conduct a comprehensive sociological study of San José Junior College during its first four years of operation. His report and that of Medsker provided a more complete analysis of the impact of social forces upon the character and role of the comprehensive two-year college than can be found elsewhere in the literature of the past six years. Knowing in advance the problems that will be encountered in attempting to develop technical and other types of terminal programs for students who are unlikely to attend college for more than two years should be of invaluable assistance to those who venture into this field. The two studies have important and direct implications for technical and semiprofessional education, whether programs are provided in the two-year college or in another type of institution.

Suggested Future Research

Of the many problems in the field of technical education which demand research effort, that of organization and administrative structure is singled out as the most crucial to the development of this phase of education. Developments to date in technical education have been sporadic, the responsibility remaining in most instances with local institutions. Many different patterns have evolved. The problems so clearly enunciated by Medsker (1960) and Clark (1960) persist. Remaining unanswered stands the ques-

tion of the kind of institution and the type of administrative structure within which semiprofessional education can be most effectively developed, although some clues are vaguely visible. The major developments in technical education lie ahead. Uniformity of administrative pattern is neither desirable nor essential, but surely the choices can be narrowed through research in depth and through planning and coordination within an entire state.

Bibliography

- BRANDON, GEORGE L. *Twin City Technicians*. East Lansing: College of Education, Michigan State University, 1958. 70 pp.
- BRUNNER, KEN AUGUST, and MORRISON, D. GRANT. *Organized Occupational Curriculums in Higher Education, Enrollments and Graduates, 1958*. U.S. Department of Health, Education, and Welfare, Office of Education, Circular No. 632. Washington, D.C.: Government Printing Office, 1961. 250 pp.
- CITIZENS ADVISORY COUNCIL. *Six-County Study of Community College Needs*. Final report. Detroit: the Council, 1960. 117 pp.
- CLARK, BURTON R. *The Open Door College*. New York: McGraw-Hill Book Co., 1960. 207 pp.
- DEWITT, NICHOLAS. *Education and Professional Employment in the U.S.S.R.* Prepared for the National Science Foundation, NSF 61-40. Washington, D.C.: Government Printing Office, 1961. 856 pp.
- FLESHER, W. R., and OTHERS. *Public Vocational-Technical Education in Oregon*. Report of a survey made for the Oregon State Board of Education. Columbus, Ohio: School Survey Service, 1958. 368 pp.
- GROVES, HAROLD M. *Education and Economic Growth*. Prepared for the Committee on Educational Finance. Washington, D.C.: National Education Association, 1961. 58 pp.
- HENNINGER, G. ROSS. *The Technical Institute in America*. New York: McGraw-Hill Book Co., 1959. 276 pp.
- HOLLIS, ERNEST V.; LAND, WILLIAM G.; and MARTORANA, S. V. *Survey of State Legislation Relating to Higher Education, January 1, 1960, to December 31, 1960*. U.S. Department of Health, Education, and Welfare, Office of Education, Circular No. 647. Washington, D.C.: Government Printing Office, 1961. 92 pp.
- McLURE, WILLIAM P., and OTHERS. *Vocational and Technical Education in Illinois: Tomorrow's Challenge*. Urbana: Bureau of Educational Research, College of Education, University of Illinois, 1960. 163 pp.
- MARTORANA, S. V., and MESSERSMITH, JAMES C. *Advance Planning To Meet Higher Education Needs, Recent State Studies, 1956-59*. U.S. Department of Health, Education, and Welfare, Office of Education, Circular No. 633. Washington, D.C.: Government Printing Office, 1960. 33 pp.
- MEDSKER, LELAND L. *The Junior College: Progress and Prospect*. New York: McGraw-Hill Book Co., 1960. 367 pp.
- U.S. DEPARTMENT OF LABOR. *Manpower: Challenge of the 1960's*. Washington, D.C.: Government Printing Office, 1960. 24 pp.
- U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *The Long-Range Demand for Scientific and Technical Personnel*. Prepared for the National Science Foundation, NSF 61-65. Washington, D.C.: Government Printing Office, 1961. 70 pp.
- UNIVERSITY OF THE STATE OF NEW YORK, STATE EDUCATION DEPARTMENT. *Needs and Facilities in Higher Education in New York State*. Albany: the Department, 1957. 124 pp.
- WOOD, HERBERT S. "A Study of Technical Education in California: Guidelines for the Development and Operation of Technical Education Programs in the Junior College." *Bulletin of the California State Department of Education* 28: 1-122; September 1959.

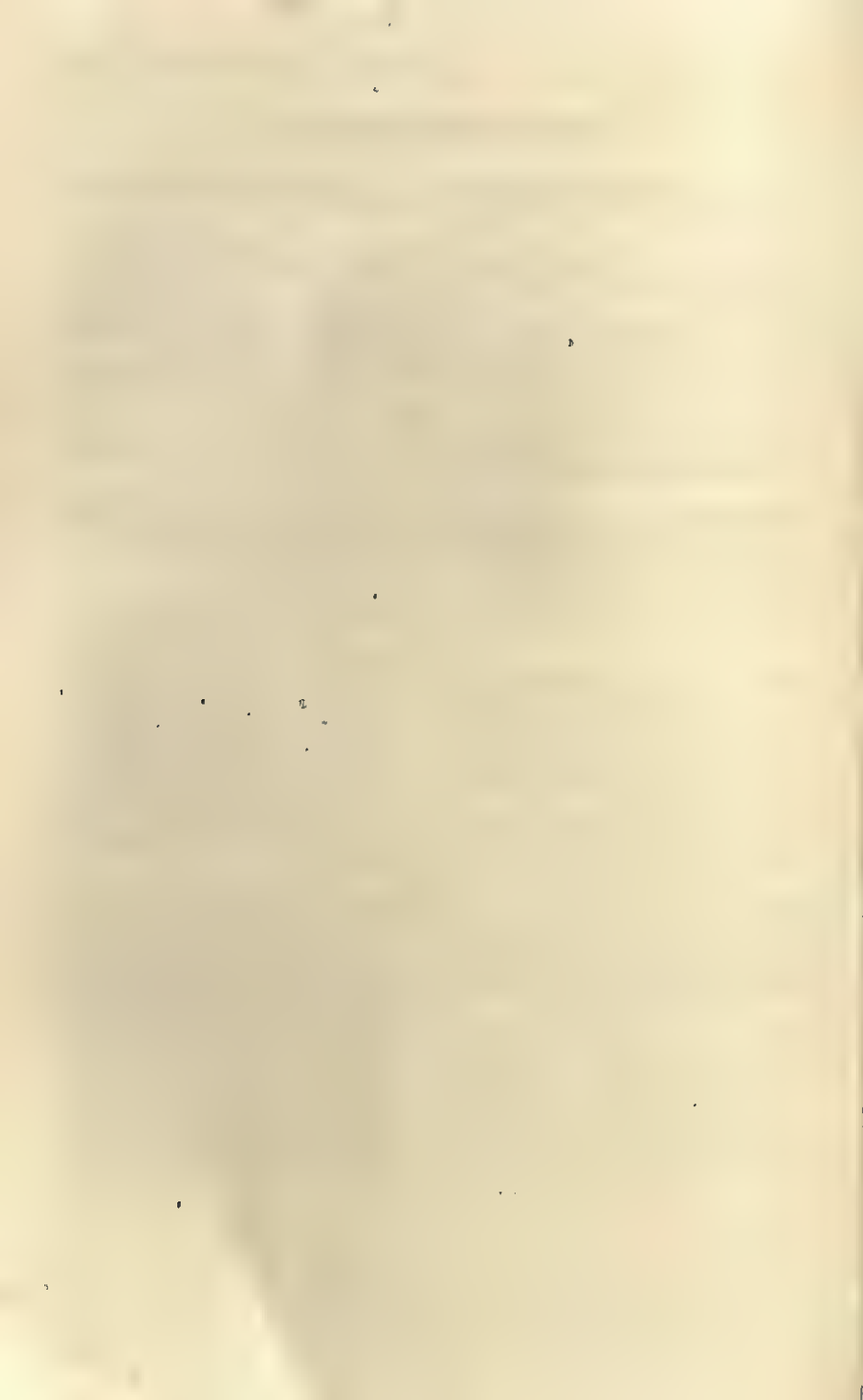
Additional References

- BRANDON, GEORGE L. *Explorations in Research Design: Curricula for Technicians*. Report on Cooperative Research Project 629 (8186), Michigan State University and U.S. Office of Education. East Lansing: Office of Research and Publications, College of Education, the University, November 1960. 81 pp.
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *A Study of the Need for Additional Centers of Public Higher Education*. Prepared for the Liaison Committee of the California State Board of Education and the Regents of the University of California. Sacramento: the Department, 1957. 172 pp.
- DAVID, HENRY, editor. *Education and Manpower*. Prepared for the National Manpower Council. New York: Columbia University Press, 1960. 326 pp.
- GINZBERG, ELI. *Human Resources: The Wealth of a Nation*. New York: Simon and Schuster, 1958. 183 pp.
- SMITH, LEO F., and LIPSETT, LAWRENCE. *The Technical Institute*. New York: McGraw-Hill Book Co., 1956. 319 pp.
- STEWART, LAWRENCE H., and WORKMAN, ARTHUR D. "Mathematics and Science Competencies for Technicians." *Bulletin of the California State Department of Education* 29: 1-50; December 1960.
- U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Population and Labor Force Projections for the United States, 1960 to 1975*. Bulletin No. 1242. Washington, D.C.: Government Printing Office, 1959. 56 pp.

Index to Volume XXXII, No. 4

Page citations, though made to single pages, often indicate the beginning of a chapter, section, or running discussion dealing with a topic.

- Administration of vocational education: evaluation, 371; financing, 371; organization, 370
- Agricultural education: adjusting to agricultural changes, 387; continuing education for farmers, 390; course content and teaching procedures, 389; evaluation, 384; general or nonvocational agriculture, 388; general studies, 385; higher education, 388; nonfarm occupations, relationship to, 386
- Business education: automation and office work, 412; basic business and economic education, 413; bookkeeping and accounting, 413; clerical practice, 414; curriculum, 411; stenography, 414; teacher preparation, 412; typewriting 415
- Career planning, job placement, and follow-up: general education, 378; general theory of vocational development, 377; specific occupational programs, 379
- College programs in home economics: characteristics and abilities of students, 397; philosophy, 396
- Curriculum: business education, 411; distributive education, 419; industrial arts, 404; technical education, 428
- Distributive education: curriculum and instruction, 419; evaluation and follow-up, 420; objectives and philosophy, 418; organization and administration, 419; suggested future research, 421
- History of vocational education: 370
- Home economics education: attitudes toward, and its teachers, 396; basis for program development, 394; college programs, 396; elementary and junior high school, 393; evaluation, 395; historical studies, 397; secondary school, 394; suggested future research, 398; teacher education, 397
- Industrial arts: curriculum and achievement, 404; foundations, 402; learning, 403; teacher education, 403
- Industrial education: industrial arts, 402; vocational-industrial education, 405
- International studies: 372
- Investment and economic development role of vocational and technical education: 373
- Manpower and education: education and economic growth, 369, 424; national manpower demand, 424
- Skill development: 371
- Sociology and psychology of work: 368
- Specific occupational programs: 379
- Technical education: assessment of basic need, 423; curriculum, 428; enrollment, 428; programs and institutions, 428; regional and local studies, 428; research and institutional planning, 425; state-wide studies of post high school education, 425; state-wide studies of technical education, 426; suggested future research, 430; technical education and the junior college, 429; technical institute, 429
- Vocational development: theory of, 377
- Vocational-industrial education: interests and aptitudes, 405; learning, 406; programs, 407; teacher education, 405
- Vocational, technical, and practical arts education: administration of vocational education, 370; current status of research, 367; history of, 370; international studies, 372; investment and economic development role of, 373; manpower and education, 369; skill development, 371; sociology and psychology of work, 368; terminology, 368



REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association
Contents are listed in the Education Index.

Copyright 1962

By National Education Association of the United States, Washington, D.C.

Volume XXXII, No. 5

December 1962

Mental and Physical Health

Reviews the literature for the six-year period
since the issuance of Vol. XXVI, No. 5, December 1956

TABLE OF CONTENTS

Chapter	Page
Foreword	438
I. Mental Health in Education	441
ELI M. BOWER, <i>National Institute of Mental Health,</i> <i>Bethesda, Maryland</i>	
II. Cultural and Social Factors in Mental Health	455
CARSON MCGUIRE, <i>University of Texas, Austin, Texas</i>	
III. Factors Influencing Individual Mental Health	464
TED LANDSMAN, <i>University of Florida, Gainesville, Florida</i>	
IV. School and Community Mental Health Programs	476
RICHARD L. CUTLER, <i>University of Michigan, Ann Arbor, Michigan</i> PHILLIP E. SPIETH, <i>University of Michigan, Ann Arbor, Michigan</i> MARY F. WILKINSON, <i>University of Michigan, Ann Arbor, Michigan</i>	
V. Mental Health and School Personnel	484
HERBERT ZIMILES, <i>Bank Street College of Education,</i> <i>New York, New York</i>	
VI. Health Education	495
EDWARD B. JOHNS, <i>University of California, Los Angeles, California</i>	
VII. Safety Education	506
CHARLES PETER YOST, <i>West Virginia University,</i> <i>Morgantown, West Virginia</i>	

<i>Chapter</i>	<i>Page</i>
VIII. Youth Fitness and Health.....	515
G. LAWRENCE RARICK, <i>University of Wisconsin, Madison, Wisconsin</i>	
WILLIAM REDDAN, <i>University of Wisconsin, Madison, Wisconsin</i>	
IX. Somatic-Psychological Interaction in Physical and Mental Health.....	530
FRANKLIN C. SHONTZ, <i>University of Kansas, Lawrence, Kansas</i>	
Index	543

Errata

Volume XXXII, No. 3, June 1962, page 235, lines 36-41: *For* The Research Division of the Canadian Education Association was formed. Support from a grant from Imperial Oil Ltd. of \$100,000 was realized. A research and information service was formed and supported by a grant from the Carnegie Corporation of \$100,000, payable over three years. *Read* The Research Division of the Canadian Education Association was formed. It was supported by a grant from Imperial Oil Ltd. of \$100,000. A Research and Information Service, established by the National Conference of Canadian Universities, was supported by a grant from the Carnegie Corporation of \$100,000, payable over three years.

Volume XXXII, No. 4, October 1962, page 411, line 24: *For* One such study at the collegiate level was made by West *read* One significant study at the collegiate level was made by West

This issue of the REVIEW was prepared by the
Committee on Mental and Physical Health

JOHN WITHALL, *Co-chairman*, University of Wisconsin, Madison, Wisconsin

G. LAWRENCE RARICK, *Co-chairman*, University of Wisconsin, Madison, Wisconsin

CARSON MCGUIRE, University of Texas, Austin, Texas

with the assistance of

ELI M. BOWER, National Institute of Mental Health, Bethesda, Maryland

RICHARD L. CUTLER, University of Michigan, Ann Arbor, Michigan

EDWARD B. JOHNS, University of California, Los Angeles, California

TED LANDSMAN, University of Florida, Gainesville, Florida

WILLIAM REDDAN, University of Wisconsin, Madison, Wisconsin

FRANKLIN C. SHONTZ, University of Kansas, Lawrence, Kansas

PHILLIP E. SPIETH, University of Michigan, Ann Arbor, Michigan

MARY F. WILKINSON, University of Michigan, Ann Arbor, Michigan

CHARLES PETER YOST, West Virginia University, Morgantown, West Virginia

HERBERT ZIMILES, Bank Street College of Education, New York, New York

FOREWORD

This issue of the REVIEW aims at achieving a balance in the treatment and reporting of the research in physical and mental health. The reader will have to be the judge of the extent to which this goal has been achieved. In the December 1949 and December 1956 issues, only limited attention was given to research on physical health. Steps in the present issue aimed at remedying this imbalance involved the inclusion of the three chapters concerned with research on youth fitness, health education, and safety education, and the introduction of a fourth chapter devoted to a consideration of the interaction of mental and physical health factors.

If one looks at the earlier issues in the health cycle of the REVIEW, it is apparent that they dealt preponderantly with mental health research. Furthermore, the research, as reported and assessed by the chapter authors, seemed largely directed at dealing with discrete variables, even traits, involved in personal-social development. There also emerged, from the review of the literature in the December 1949 issue, the impression that many studies of that period were geared to testing or identifying cure-all procedures or technics for enhancing mental health and for mitigating mental illness. However, the chapter by McClusky in that issue anticipated and foreshadowed some of the current research and thinking on "positive" mental health that will be described in this issue of the REVIEW. The investigations reported by McClusky seemed to indicate to him that the basic concern of schools and teachers is "not remediation but prevention and facilitation" and that the style of instruction in classrooms as well as the interaction patterns of teachers with learners, as perceived by the learners, have major implications for the personal-social development of students.

The December 1956 REVIEW was particularly interesting because it chronicled the launching of the Joint Commission on Mental Illness and Health. The final report of the Commission appeared last year. The centrality of the school, ranking in importance second only to the home in the social-emotional development of the individual, emerged clearly in the reports and assessments in the 1956 issue. For instance, Biber was cited as emphasizing that in order to help teachers to develop facilitative and helping attitudes toward learners, teacher education programs, whether in-service or preservice, have to afford experiences to teachers that are so compelling that they not only influence but also alter the attitudes and interactions of the teacher with the learners. Jahoda's summative work was reported in that issue as well as Jersild's exploration of the need for the teacher's understanding and acceptance of himself in order to be effective in the classroom. Seeley's Forest Hill Village Project was reported, including the effort of that study to develop a special service group to meet the needs and interests of emotionally handicapped youngsters. Thus it is apparent that a different research frame of reference and orientation from that underlying the 1949 issue was reflected in the 1956 issue.

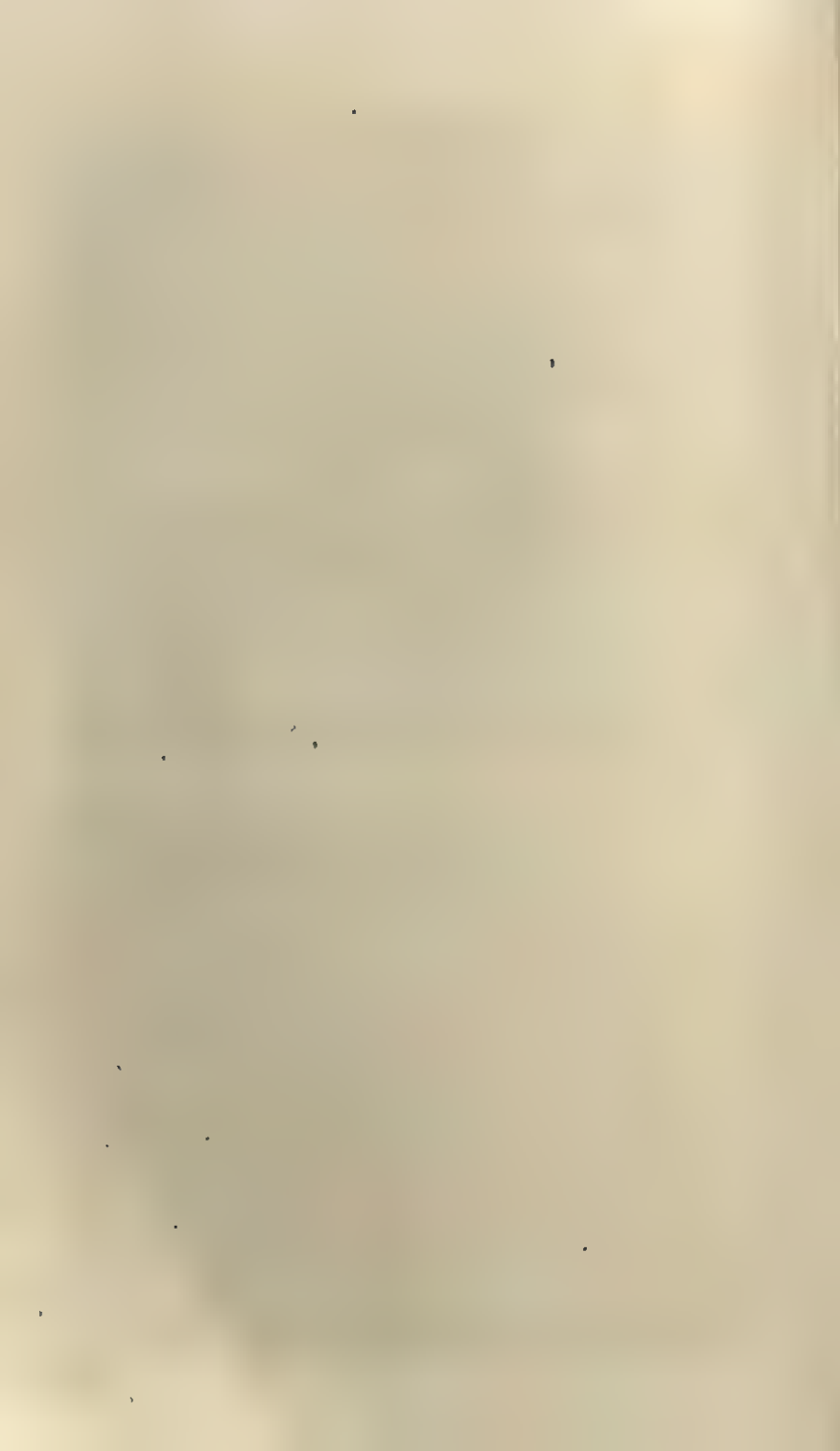
As has already been indicated, the present issue on mental and physical health contains three chapters, "Health Education," "Safety Education," and "Youth Fitness and Health," that are devoted almost entirely to research on physical health. Two chapters, "School and Community Mental Health Programs" and "Somatic-Psychological Interaction in Physical and Mental Health," underline the interdependence of the two facets. The chapters entitled "Factors Influencing Individual Mental Health" and "Cultural and Social Factors in Mental Health" explore at some length investigations on the human being's psychological welfare in a very complex environment. Finally, the intricacies, problems, and implications of studies organized and conducted in educational settings at all levels are described and evaluated in the chapters entitled "Mental Health in Education," "School and Community Mental Health Programs," and "Mental Health and School Personnel."

The chapter authors have obviously digested and assessed the considerable body of literature of the past six years with care and insight. From the opening chapter through the concluding one a vast and rich field of research is traversed. It may well be that a first step toward integration and organization of this huge area occurs when one becomes at least cognizant of the fact that unifying principles and an organized theory are lacking and needed.

It is the hope of those who labored to produce this issue that it will serve the needs of those who are seeking research sources in the area of mental and physical health.

JOHN WITHALL* and G. LAWRENCE RARICK,
*Co-chairmen, Committee on Mental
and Physical Health*

* John Withall has been sent by the University of Wisconsin to the Ivory Coast to serve for the next two years as the University Representative with the Teaching Project of the Peace Corps.



CHAPTER I

Mental Health in Education

ELI M. BOWER *

IN ATTEMPTING to identify some of the major concepts of mental health in education, one should find the presentation by Ryan in the December 1956 issue of the REVIEW to be both informative and stimulating. In this current review of research concerning aspects of mental health in education, attention is given to (a) concepts of mental health and of education, including their interrelationships, (b) ego development in educational processes, (c) mental health factors in school achievement, (d) early identification of children with developing mental health problems, and (e) psychoeducational approaches to the education of emotionally handicapped children.

Concepts of Mental Health and of Education

Concepts of Mental Health

Considerable confusion has long existed regarding what is meant by mental health. Nevertheless, the report by Jahoda (1958) to the Joint Commission on Mental Illness and Health concerning the nature of positive mental health made a courageous and productive attempt to clarify value dilemmas, to summarize past efforts, and to offer empirical indicators for recognizing positive mental health. Jahoda identified such indicators as having to do with attitudes toward self, with relations of the individual and reality, and with active efforts to master one's environment. Jahoda also noted that, while the meaning of positive mental health is elusive, the concept of mental illness is no closer to a consensus. Indeed, Szasz (1961) questioned the assignment of mental and emotional disorders to the realm of illnesses and suggested that "problems in living" be considered as a more realistic and meaningful substitute.

Investigators such as Klein (1960) and Smith (1961) have utilized Jahoda's definition to explore further the interrelations of three dimensions of mental health: self, reality testing, and environmental mastery. Does a deficit in one imply that an individual no longer enjoys positive mental health? Or must one's standing in all three dimensions be reduced for ill health to ensue? To answer these questions, Klein (1960) proposed that mental health be appraised in terms of three connotations: (a) "sound-

* The material presented in this chapter represents a condensation of a longer review of research, copies of which are available from the author.

ness," an enduring state of a "healthy" personality recognizable in such qualities as the presence of adaptability, the use of social skills, the demonstration of a high degree of initiative, and the possession of a general perfusion of modest optimism; (b) "well-being," an immediate or current state of health or effectiveness in dealing with stress or crisis; and (c) "emotional stability," the ability of the individual to cope with specific environmental stresses over a period of time, while maintaining a state of emotional well-being. Klein pinned down four kinds of emotional stability: (a) general stability, (b) specific stability, (c) inherited stability, and (d) acquired stability. He was particularly concerned with the ways in which acquired stability could be used in the organism's adjustment to potentially stressful situations.

Such stability would be acquired by organisms which have had experience with stress-inducing agents and in the process have developed successful nonillness-producing ways of coping with the stress. In this conceptual framework of positive mental health, it might be possible to discover situations in which small amounts of stress could render individuals increasingly able in the future to tolerate greater degrees of stress of a similar nature. For example, sibling rivalry, often regarded as a circumstance contributing to a variety of behavioral and emotional disorders, could be thought to serve as a potential immunity-producing experience that would help one to manage stress accompanying competitive relationships. One could hypothesize that a home in which there is reasonable and affectionate access to parental guidance would appear to offer one the opportunity for learning how to cope constructively with stress-inducing situations.

Smith (1961), who has considered the conceptual problems of mental health, commented on the shift from exclusive concern with mental illnesses toward an interest in positive mental health. Such a shift, however, has not been accompanied by any real gains in research or scientific understanding. Mental health or illness is still concerned with the evaluation of the personality in terms of criteria that are value oriented. Values, which are inherent in definitions of mental illness, are taken for granted primarily because there is little disagreement about them. It is natural to assume that something is wrong with a person who behaves "strangely" or whose thinking is disordered. What is "right" about a person with positive mental health is another matter. The variety and breadth of values that underlie such definitions are rarely acceptable or explicit to all. Consequently, in his reconsideration of the problem of mental health, Smith questioned the bases with respect to which mental health has been conceptualized.

Why has there been an increased emphasis on defining concepts of positive mental health? The demand, concluded Smith (1959), comes increasingly from those practitioners who are concerned with the socialization and education of children. Many practitioners, educators, parents, and social and behavioral scientists who are on the firing line must seek

direction for their efforts. Smith (1961) suggested four prerequisites for dealing adequately with the nonscientific value-laden aspects of positive mental health: First, the values in mental health goals should be made explicit. For example, if the "good life" is one of the goals, the term *good* needs to be defined explicitly and, if possible, operationally. Second, such positive mental health concepts as are proposed should be capable of some measurement. Third, they should fit within the framework of an acceptable personality theory. Fourth, they should be relevant to the social context in which they are conceived; for example, mental health in education should concern itself with goals relevant to educational institutions and educational processes.

At this point, reference needs to be made to Kubie's relentless pursuit of the concept of mental health in psychiatric and educational literature. Kubie (1957, 1959) argued that behavior judged to be socially desirable or undesirable can be the consequence of many factors, but that the main difference between the individual with sound mental health and the individual with impaired mental health is basically one of organismic elasticity, or homeostasis. The essence of behavior reflecting favorable mental health is flexibility; in contrast, frozen or relatively unalterable behavior is characteristic of the neurotic process, whether it be in impulses, purposes, acts, thoughts, or feelings.

Kubie (1957) also stated that behavior can be regarded as neurotic if it is the product of processes that predetermine its automatic repetition. Such processes usually stem from unconscious forces in the personality. In another paper, Kubie (1959) declared that behavior which is motivated primarily by unconscious forces will, in fact, become recurring and repetitive, since the goals of such behavior are rarely attainable. Although behavior motivated by unconscious forces may be useful and valuable in maintaining the health and personality integration of the individual, nevertheless, such behavior does become relatively unresponsive to changing environmental conditions.

One might well question the assumption, as does Redlich (1957), that acts determined by conscious or preconscious forces are "healthier," in the sense of being freer, than acts motivated by unconscious forces. Is it not probable that unconscious defense mechanisms are health producing in their adaptive and self-protective goals? These defenses can be said to be health maintaining or health producing to the extent to which the individual needs to utilize them to maintain what may be termed his self-esteem and to mediate noxious forces in his environment. Yet it would seem obvious that the increased and continuous use of such unconscious mechanisms would in the long run render the organism less able to choose alternative modes of behaving.

Bower and others (1958) proposed the concept of degrees of freedom, or the number of behavioral alternatives available to an individual, as a measure of positive mental health. In a similar vein, Kubie (1959) reported that restrictions of personality freedom are universal components

of common early childhood experiences. However, the restrictions that pose a neurotic potential can be directed and modified by educational experiences, stresses, and exceptional circumstances. According to Kubie (1959), the basic question that mental health and educational leaders and planners need to ask is "How can we equip a child with the facts, skills and understandings which he will need in life without interfering with his freedom to use such facts, skills and tools productively and creatively?"

Concepts of Education in Relation to Mental Health

Today public education has found itself facing the task of providing the intellectual, social, and affective nutrients to children and adolescents, many of which could formerly be obtained from other sources. As pointed out by Kotinsky and Coleman (1955), this perception of successful education as a prerequisite for adequate personality development of children and adolescents may be reflected in the general tendency to blame the school for all that goes amiss with the state of the nation, including increases in the rate of divorce, delinquency, automobile fatalities, and mental illness.

Education can be regarded as those experiences that mediate the culture to children. Such experiences can be provided in a variety of ways—through reading groups, teaching machines, television, lectures, seminars, individual study, group discussions, and reading. The important link that the behavioral sciences have provided to educational practice is a circular one that connects cognitive mastery as represented in the acquisition of the meanings of symbols, participation in problem solving, and attainment of reading and other intellectual skills with the emotional satisfactions and development that lead to self-identification, maturity, and freedom to relate to others.

One cannot readily separate the nature of the child's learning experiences in school from his total growth as a personality. It may be hypothesized that educational experiences contribute to the potential of favorable mental health or ill health. A variety of different kinds of research can be utilized to support this hypothesis. In a 30-year follow-up study of children who were referred to a child guidance clinic, O'Neal and Robins (1958) related childhood behavioral problems to adult psychiatric states. The investigators chose from the files of the public schools a control group of students who were similar to children referred to the clinic in age, sex, intelligence, ethnic membership, and residence. Although they had intended to use the control group for comparison purposes only, they were struck by the results, which showed that the simple criteria used to choose the control subjects—no excessive absences, no full grades repeated, no disciplinary action recorded, and an intelligence quotient of 80 or higher—had yielded a group with a high level of emotional health. The difference

between the control sample and the clinical group was particularly striking in view of the fact that the former group was drawn largely from a neighborhood of low socioeconomic status. Moreover, in about one-third of the cases there was a history of broken homes.

Another kind of longitudinal study was carried out by the President's Commission on the Conservation of Human Resources. The Commission sought to understand why one out of every seven men was judged to be mentally and/or emotionally incapable of serving in the U.S. Armed Forces in time of war. In a report of the work of the research staff of the Commission, Ginzberg and others (1959) concluded that although a high level of educational attainment was not a safeguard against emotional disorders, the lower the educational level of a region, the higher the incidence of failure in the Armed Forces attributable to emotional disorders. Ginzberg noted that inadequate education and emotional problems tend, over a period of time, to reinforce one another and that learning difficulties and home difficulties seemingly combine to produce inadequate adults. This circular phenomenon was illustrated in an investigation by Bower and others (1958), in which measures of reading and arithmetic achievement of emotionally disturbed children and of their classmates were compared in grades 4, 5, and 6. The emotionally disturbed children achieved below their classmates. Moreover, the differences increased at each successive grade level.

Additional evidence for the circular phenomenon was apparent in studies of children who, unable to function in school, sought to leave or to escape from it. In an extensive investigation of 105 high school students who were on the verge of dropping out, Lichter and others (1962) found that, in general, such adolescents had budding character disorders that dated back to elementary school. The school difficulties were judged to be either the outcomes of or the antecedents to a psychodynamic conflict from which the child sought refuge.

Mental Health Within the Educational Process

What is mental health in education? One cannot consider mental health activities apart from the educational or social processes in which personality growth is embedded. Neubauer and Beller (1958) noted that the contribution of mental health to education is the facilitation of learning and the learning process—not the pursuit of particular activities or objectives of its own. Biber (1961) suggested that mental health is better derived from the intrusive quality of the intellectual educational experience than from any therapeutic regime, specifically planned for the school. Biber also commented on the past emphasis placed upon the human relations aspect of school life as the main line to mental health. The error in this lay in making the teacher-child relationship and the child-child relationship the content rather than the bridge of learning. When one talks of education as a part of a program of mental health promotion or mental illness

prevention, one needs to spell out the theoretical assumptions in terms of which specific educational procedures may be said to enhance mental health.

Sanford (1962a, b) argued that if educational processes are to be effective they must involve a change in the structure of development of personality through its expansion, differentiation, or integration. Sanford perceived education as a process which, among other things, frees and encourages the impulse life of children and adolescents. Sanford (1962b) urged that students need to be shown that the world of literature, drama, art, and science offers the best means by which the impulses and imagination of childhood can find gratification.

Hollister (1959) and Hollister and Goldston (1962a, b) diagrammed and described the emerging pattern of relationship between education and mental health. In the education of all children, including children with mild emotional handicaps, the relationship should be one of utilizing all social and behavioral science research in the development of curriculums and in the training of teachers, pupil-personnel workers, health workers, and administrative staffs. In addition, mental health personnel should assist school personnel in the pivotal function of establishing and building close liaison with parents. This latter function, as suggested by Conant (1961), is especially critical in slum and low socioeconomic areas. What a school should do and can do is to a large extent determined by the statuses and ambitions of the families being served. Similarly, the Joint Commission on Mental Illness and Health (1961) pointed out that society at present has no pervasive mental health resources that encompass the family within their structures, except as home-school liaison might be so conceived.

Educational and mental health agencies have become closer and more integrative than previously in their efforts to provide effective educational experiences for moderately to severely handicapped children. In the education of emotionally disturbed children, close collaboration of teachers and clinicians has been taking place. Hollister (1961) described how working with parents of this group has been assumed by trained community and residential mental health personnel. For moderately handicapped children, curricular adjustments have been made. Pupil personnel services within the school as well as assistance from outside mental health agencies have been available. Helpful descriptions of such activities may be found in the recently published textbook by White and Harris (1961). It is important to note, as have Allinsmith and Goethals (1962), that in this continuing relationship between specialists in mental health and personnel in education, both groups have exchanged skills and techniques in realizing the goals of both education and mental health. In a recent publication, the National Society for the Study of Education (1959) has described how schools, in their efforts to carry out the responsibility of educating all the children of all the people, have enlisted the mental health profession as a helpful ally in realizing educational objectives.

Ego Development in Educational Processes

Behavior can be regarded as the result of an interaction between an organism and the environment (internal and external) mediated or interpreted by personality processes called ego processes. Such ego processes are undoubtedly learned in the course of an organism's early adaptive struggles. In time they become a polarized window through which the world and the self are conceptualized. Behavioral sciences have come to regard the construct of ego strength (that is, ego processes which enhance a positive perception of self and others, encourage a vigorous relationship to the environment, and enable the organism to manage stress in a healthful manner) as a function of the processes of growth and learning. This implied assumption of a unity between intellect and personality is to a large degree based on clinical experiences and research on an ego process called identification, from which it appears that children often introject the opinions and attitudes of key adult figures.

Of major concern to behavioral scientists and educators are those factors which encourage a defensive reaction of a person to an event and those which encourage a coping pattern. In terms of the thinking of such writers as Klein and Ross (1958) and Murphy (1961), coping is an approach to the handling of stress or a problem of living in such a manner that the result is a stronger and healthier organism—an organism in a more fluid and effective homeostasis, or balance. On the other hand, a defensive pattern constitutes an approach by the organism to the stress or problem that results in a less resilient state—that is, a more fixed and rigid homeostasis. Consequently an organism that employs defensive ego processes will, in time, lose the ability to function freely with new problems. Murphy (1961) suggested some major factors in evaluating and enhancing the positive coping resources of children. Among these are (a) the range of gratification available to the child, including his interests; (b) his positive outgoing attitude toward life, including pride in himself; (c) the range and flexibility of his defense devices; and (d) his capacities to regress, to let down, and to retreat to a safer level of functioning. Increased use of defenses will in time produce the repetitive, rigid pattern of behavior which Kubie (1959) has labeled the neurotogenic component of education. To Kubie, this component represents the failure of education since its presence prevents or limits man's ability to change.

The relationship of ego development and educational processes has only begun to be identified and described. Future research should provide operational definitions or analogues of ego strength and should identify the specific educational processes that can be expected to influence the development of ego-strengthening processes in the personality.

Mental Health Factors in School Achievement

Investigators have frequently reported the existence of a positive relationship between successful school experiences and the ability to do pro-

ductive work. For example, Miller (1958) considered reading disability as a syndrome that could be studied epidemiologically and that could be used as an index of antisocial behavior. In one school, Miller found that 16.1 percent of fifth-graders were reading below third-grade level. In a two-year follow-up study, the reading status was found to remain relatively constant. Those children identified as retarded in reading exhibited, almost without exception, serious problems in social and academic adjustment. A compilation and analysis of a large body of research by Traxler and Townsend (1955) confirmed the high positive relationship between reading achievement and personal-social adjustment.

Although it would be difficult to support the hypothesis that reading difficulties are necessarily the result of emotional difficulties (since emotional disturbances could also result from a child's inability to compete effectively with other children in reading skill), the secondary effects of this disability were apparent in the chapter by Bower and Holmes in the December 1959 REVIEW. Delacato (1959) reported upon studies concerning cerebral dominance and mixed laterality as possible contributors to lack of achievement in reading. The basic premise suggested by Delacato is that hemisphere dominance, which is the last step in the phylogenetic development of the brain, is most easily affected by damage or arrested development. Another dimension of reading disability is undoubtedly that of social deprivation, as indicated in the writings of Conant (1961), Lambert and Bower (1961), and Pressman (1962).

Yet, from whatever etiology or combination of factors reading disability arises, its impact on a child's school progress is pivotal. Achievement probably precedes all other factors as a basic factor in school success. For example, Bower (1960) found that in kindergarten (before academic values are stressed) the future achiever is not perceived any differently from the nonachiever. In the first and subsequent grades, however, those children who become successful achievers also become the most socially acceptable.

Although lack of achievement in arithmetic does not seem to be so ominous a sign as reading disability, it is worthy of study. Bower (1960) noted that when the arithmetic achievement of emotionally handicapped children was compared with that of their classmates, the differences were found to be relatively greater than those in reading skill. This may be due in part to the impact of reading difficulties on certain of the arithmetic tests in which reading is a factor. It is also possible that arithmetic is more abstract and less meaningful to children with mental health problems. Undoubtedly, it is a type of learning that requires a high degree of concentration and attention.

The inability of children to concentrate and to attend because of emotional anxiety has been a subject of research for a number of investigators. Pickrel (1958) found that persons scoring high on a test of "manifest anxiety" were able to solve problems which contained only a few alter-

native solutions faster than a group of individuals scoring low on the same test. However, on tasks that involved a greater number of alternatives or degrees of freedom, students with lower scores on the measure of anxiety did better than the students with higher scores. McKeachie, Pollie, and Speisman (1960) tested the hypothesis that the anxiety resulting from test items that were difficult or ambiguous could be reduced if the testees were encouraged to write comments about those test items that disturbed them. Such opportunities did indeed produce higher achievement scores for those students who participated. Calvin, McGuigan, and Sullivan (1957) confirmed these findings and also reported that those subjects who made the most comments showed the greatest improvement. An additional dividend to the investigation of McKeachie, Pollie, and Speisman (1960) was the finding that when students who were asked to comment on their "feelings" about an item were compared to another group who were asked to comment in terms of further explanations of the item, the latter group made slightly higher scores. It was suggested that such talking activity may not be effective in learning unless it involves verbalizing cognitive as well as affective elements.

Stress and anxiety in the school seem to be related to dropout. In an intensive study of 45 girls and 60 boys who were about to drop out of school, Lichter and others (1962) indicated that the reason was not the result of any specific learning failure but a broad educational disability. They interpreted the dropping out to be an escape, or a turning away, rather than a positive kind of action. They found that the problems for boys tended to start in elementary school and that those for girls tended to originate in adolescence.

What has research revealed about the relationship of mental health to the achievement of the college student? Jacob (1957) concluded that college experience had only a minor effect on the quality of student judgment, social responsibility, and understanding. His findings did not support the widely held assumption that college education exerts a liberalizing influence upon adolescents. In a methodological examination of Jacob's study, Barton (1959) questioned Jacob's conclusion, which he felt had not been substantiated. Barton stated that, at best, Jacob's work was a set of challenging hypotheses. In finding substantial changes of attitude in students during their college experiences, Webster (1958) interpreted his results as supporting those personality theories that emphasize increasing complexity, differentiation, and acquisition of independence in psychological development.

Spielberger (1962) studied the relationship of measures of manifest anxiety to college achievement for two samples of comparable ability. The group of students judged to be highly anxious, when compared with the group thought to be low in anxiety, did less well in terms of their over-all college grades. Although several high-anxiety students were found to be academic failures at all levels of ability, interestingly enough an analysis of the achievement level of students with both high academic

ability and high anxiety level suggested that a high anxiety level may actually facilitate achievement. These findings may be consistent with Spence's (1958) suggestion that anxiety may provide increased motivation for students.

Unfortunately, there are those individuals whose emotional problems may contribute to their dropping out of college. Harrison (1958) studied 179 students who left Yale between 1947 and 1952 supposedly because of emotional difficulties. He noted that 86 of the 179 returned and that, of these, 69 percent were graduated. He also reported that those diagnosed as neurotic or psychotic had better than a 3 to 1 chance of succeeding upon return. Thus, the hypothesis that the appearance of a psychosis or neurosis in this age group (and socioeconomic level) usually leads to a major disruption in academic or life career is not too strongly supported. In fact, Harrison found that dropping out frequently led to an apparently effective resolution of the emotional conflict, perhaps because of the opportunity afforded for extensive therapy.

Early Identification of Children with Developing Mental Health Problems

Comprehensive summaries of procedures aimed at the early identification of children with learning and behavioral disorders of a developmental nature were given by Bower (1960), Gildea and others (1958), and Ullman (1957). Bower pointed out the social and value conflicts inherent in such programs and the strategic position of the school in the early identification of emotional problems in children.

A recent publication of the California State Department of Education (1961) reported that children's judgments of the personalities of other children were surprisingly accurate and predictive of emotional disturbances, that teachers' judgments of emotional statuses of children were similar to those of clinicians, and that teachers identified about the same proportion of children to be either overly withdrawn or overly aggressive. It was noted that about three children in each classroom had moderate to serious emotional problems and that differences between emotionally handicapped children and their classmates increased in each succeeding grade. Useful adaptation of materials used in the California investigation was described in a manual for teachers prepared by Lambert and Bower (1961).

Psychoeducational Approaches to the Education of Emotionally Handicapped Children

The problem of educating emotionally handicapped children has been one of the major factors in the increased liaison between the mental health and education professions. Three general trends in mental health program-

ming in the classroom were identified by Hollister (1959) as follows: (a) increased confidence and experience in the impact of group settings as a basis for healing or change, (b) increased use of mental health intermediaries, such as teachers, as the major dispensers and carriers of mental health programs along with the help and support of behavioral scientists and practitioners, and (c) greater and more imaginative use of psychoeducational classroom and diagnostic techniques and of special educational and guidance programs. Hollister and Goldston (1962a) pointed out the need to identify the essential psychoeducational processes used in educating disturbed children and attempted to develop a preliminary taxonomy of the procedures and considerations involved. In another publication, Hollister and Goldston (1962b) identified 13 kinds of psychoeducational processes as relevant to the education of emotionally disturbed children in special classes: administrative processes, screening and diagnosis, planning, placement and continuous assessment, classroom relationship, classroom-motivation developmental processes, perceptual-retraining processes, behavior management, behavior re-education, academic education, rehabilitation to the regular classroom, clinician-educator liaison, and school-home liaison.

That mental health consultation as a method of helping teachers has emerged and grown is also evident in a publication of the California State Department of Mental Hygiene (1961). The use of a school mental health unit to assist school staff in their work with all children was described by Lawrence, Spanier, and Dubowy (1962). The objective of the unit in relation to the teachers was to increase their awareness of their own strength and resources in educating children. Basically, these and other programs supported Prescott's (1957) premise that the multitudinous daily decisions made by teachers are the fundamental bases of the educative process.

The education of moderately or severely emotionally disturbed children has emerged as another area of concern and of collaboration between educators and mental health personnel. The previously cited publication of the California State Department of Education (1961) reported on a state-wide research program that included 13 different kinds of classroom approaches. Morse (1958) discussed the educational problems of disturbed children in relation to differential diagnosis as well as to the kind of teaching required. Haring and Phillips (1962) suggested one specific approach: use of the structured classroom.

It is apparent that research in the development, preparation, and coordination of pupil personnel workers including psychologists, social workers, counselors, nurses, and physicians has increased. Formation of the National Research Commission on Pupil Personnel Services, as announced by the U.S. Office of Education and the National Institute of Mental Health, and increased utilization of National Defense Education Act funds have encouraged new developments in this field.

Some of the challenges for additional or new research include the development of ways to (a) identify, as early as possible, children with emotional disturbances, (b) demonstrate the effectiveness of teacher education programs and of pupil personnel programs that have been designed largely for the promotion of improved mental health, (c) determine the advantages of curricular experiences that are planned to enhance the ego of the child with positive mental health as well as the one with moderate or serious mental health problems, (d) ascertain whether use of emotionally hazardous situations and crises are effective in building satisfactory coping patterns in children, and (e) evaluate the effectiveness of various school-community programs intended to improve mental health.

Bibliography

- ALLINSMITH, WESLEY, and GOETHALS, GEORGE W. *The Role of Schools in Mental Health*. Joint Commission on Mental Illness and Health, Monograph Series No. 7. New York: Basic Books, 1962. 337 pp.
- BARTON, ALLEN H. *Studying the Effects of College Education: A Methodological Examination of Changing Values in College*. New Haven, Conn.: Edward W. Hagen Foundation, 1959. 96 pp.
- BIBER, BARBARA. "The Integration of Mental Health Principles in the School Setting as Part of a Program of Primary Prevention." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 15, pp. 323-52.
- BOWER, ELI M. *Early Identification of Emotionally Handicapped Children in School*. Springfield, Ill.: Charles C. Thomas, 1960. 120 pp.
- BOWER, ELI M., and OTHERS. *A Process for Early Identification of Emotionally Disturbed Children*. Bulletin No. 6. Sacramento: California State Department of Education, August 1958. 111 pp.
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *The Education of Emotionally Handicapped Children*. Report to the California Legislature. Sacramento: the Department, 1961. 76 pp.
- CALIFORNIA STATE DEPARTMENT OF MENTAL HYGIENE. *Programming Consultation Services to Schools by Mental Health Specialists*. Sacramento: the Department, 1961. 45 pp.
- CALVIN, ALLEN D.; MCGUIGAN, F. J.; and SULLIVAN, MAURICE W. "A Further Investigation of the Relationship Between Anxiety and Classroom Examination Performance." *Journal of Educational Psychology* 48: 240-44; April 1957.
- CONANT, JAMES B. *Slums and Suburbs*. New York: McGraw-Hill Book Co., 1961. 147 pp.
- DELCATO, CARL H. *The Treatment and Prevention of Reading Problems: The Neuropsychological Approach*. Springfield, Ill.: Charles C. Thomas, 1959. 122 pp.
- GILDEA, MARGARET C.-L., and OTHERS. "Community Mental Health Research: Findings After Three Years." *American Journal of Psychiatry* 114: 970-76; May 1958.
- GINZBERG, ELI, and OTHERS. *The Ineffective Soldier: Lessons for Management and the Nation, Patterns of Performance*. New York: Columbia University Press, 1959. Vol. 3, 340 pp.
- HARRIS, NORRIS G., and PHILLIPS, E. LAKIN. *Educating Emotionally Disturbed Children*. New York: McGraw-Hill Book Co., 1962. 322 pp.
- HARRISON, ROBERT W. "Leaving College Because of Emotional Problems." *Psychosocial Problems of College Men*. (Edited by Bryant M. Wedge.) New Haven, Conn.: Yale University Press, 1958. Chapter 5, pp. 95-112.
- HOLLISTER, WILLIAM G. "Current Trends in Mental Health Programming in the Classroom." *Journal of Social Issues* 15: 50-58; January 1959.
- HOLLISTER, WILLIAM G. "The Care and Feeding of Consultants." *Programming Consultation Services to Schools by Mental Health Specialists*. Sacramento: California State Department of Mental Hygiene, 1961. Chapter 7, pp. 35-43.

- HOLLISTER, WILLIAM G., and GOLDSTON, STEPHEN E. *Considerations for Planning Classes for the Emotionally Handicapped*. Washington, D.C.: Council for Exceptional Children, 1962. 30 pp. (a)
- HOLLISTER, WILLIAM G., and GOLDSTON, STEPHEN E. "Psychoeducational Processes in Classes for Emotionally Handicapped Children." *Journal of Exceptional Children* 28: 351-56; March 1962. (b)
- JACOB, PHILIP E. *Changing Values in College: An Exploratory Study of the Impact of College Teaching*. New York: Harper & Brothers, 1957. 174 pp.
- JAHODA, MARIE. *Current Concepts of Positive Mental Health*. New York: Basic Books, 1958. 136 pp.
- JOINT COMMISSION ON MENTAL ILLNESS AND HEALTH. *Action for Mental Health*. New York: Basic Books, 1961. 338 pp.
- KLEIN, DONALD C. "Some Concepts Concerning the Mental Health of the Individual." *Journal of Consulting Psychology* 24: 288-93; August 1960.
- KLEIN, DONALD C., and ROSS, ANN. "Kindergarten Entry: A Study of Role Transition." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 60-69.
- KOTINSKY, RUTH, and COLEMAN, JULES V. "Mental Health as an Educational Goal." *Teachers College Record* 56: 267-76; February 1955.
- KUBIE, LAWRENCE S. "Social Forces and the Neurotic Process." *Explorations in Social Psychiatry*. (Edited by Alexander Leighton and others.) New York: Basic Books, 1957. Chapter 3, pp. 77-104.
- KUBIE, LAWRENCE S. "Are We Educating for Maturity?" *NEA Journal* 48: 58-63; January 1959.
- LAMBERT, NADINE, and BOWER, ELI M. *Teachers' Manual: In-School Screening of Emotionally Handicapped Children*. Princeton, N.J.: Educational Testing Service, 1961. 72 pp.
- LAWRENCE, MARGARET MORGAN; SPANIER, IRENE J.; and DUBOWY, MILDRED W. "An Analysis of the Work of the School Mental Health Unit of a Community Mental Health Board." *American Journal of Orthopsychiatry* 32: 99-108; January 1962.
- LICHTER, SOLOMON O., and OTHERS. *The Drop-Outs*. Chicago: Free Press, 1962. 302 pp.
- MCKEACHIE, J. W.; POLLIE, DONALD; and SPEISMAN, JOSEPH. "Relieving Anxiety in Classroom Examinations." *The Adolescent: A Book of Readings*. (Edited by Jerome M. Seidman.) New York: Holt, Rinehart and Winston, 1960. pp. 408-20.
- MILLER, ALAN D. "The Role of the School System in a Mental Health Program." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 135-40.
- MORSE, WILLIAM C. "The Education of Socially Maladjusted and Emotionally Disturbed Children." *Education of Exceptional Children and Youth*. (Edited by William M. Cruickshank and G. Orville Johnson.) Englewood Cliffs, N.J.: Prentice-Hall, 1958. Chapter 13, pp. 557-608.
- MURPHY, LOIS BARCLAY. "Preventive Implications of Development in the Preschool Years." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 10, pp. 218-48.
- NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. *Personnel Services in Education*. (Edited by Nelson B. Henry.) Chicago: National Society for the Study of Education, 1959. 303 pp.
- NEUBAUER, PETER B., and BELLER, EMANUEL K. "Differential Contributions of the Educator and Clinician in Diagnosis." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 36-45.
- O'NEAL, PATRICIA, and ROBINS, LEE N. "The Relation of Childhood Behavior Problems to Adult Psychiatric Status: A 30-Year Follow-Up Study of 150 Subjects." *American Journal of Psychiatry* 114: 961-69; May 1958.
- PICKREL, E. W. "The Differential Effect of Manifest Anxiety on Test Performance." *Journal of Educational Psychology* 49: 43-45; February 1958.
- PRESCOTT, DANIEL A. *The Child in the Educative Process*. New York: McGraw-Hill Book Co., 1957. 502 pp.
- REDLICH, F. C. "The Concept of Health in Psychiatry." *Explorations in Social Psychiatry*. (Edited by Alexander H. Leighton and others.) New York: Basic Books, 1957. Chapter 5, pp. 138-64.

- REISSMAN, FRANK. *The Culturally Deprived Child*. New York: Harper & Brothers, 1962. 140 pp.
- SANFORD, NEVITT, editor. *The American College: A Psychological and Social Interpretation of the Higher Learning*. New York: John Wiley & Sons, 1962. 1084 pp. (a)
- SANFORD, NEVITT. "Implications of Personality Studies for Curriculum and Personnel Planning." *Personality Factors on the College Campus*. (Edited by Robert Sutherland and others.) Austin, Tex.: Hogg Foundation for Mental Health, 1962. Chapter 1, pp. 3-28. (b)
- SMITH, M. BREWSTER. "Research Strategies Toward a Conception of Positive Mental Health." *American Psychologist* 14: 673-81; November 1959.
- SMITH, M. BREWSTER. "Mental Health Reconsidered: A Special Case of the Problem of Values in Psychology." *American Psychologist* 16: 299-306; June 1961.
- SPENCE, KENNETH. "A Theory of Emotionally Based Drive (D) and Its Relation to Performance in Simple Learning Situations." *American Psychologist* 13: 131-41; April 1958.
- SPIELBERGER, CHARLES D. "The Effects of Manifest Anxiety on Academic Achievement of College Students." *Mental Hygiene* 46: 420-26; July 1962.
- SZASZ, THOMAS. *The Myth of Mental Illness*. New York: Paul B. Hoeber, 1961. 337 pp.
- TRAXLER, ARTHUR E., and TOWNSEND, AGATHA. *Eight More Years of Research in Reading*. New York: Educational Records Bureau, 1955. 283 pp.
- ULLMANN, CHARLES A. "Teachers, Peers and Tests as Predictors of Adjustment." *Journal of Educational Psychology* 48: 257-67; May 1957.
- WEBSTER, HAROLD. "Changes in Attitudes During College." *Journal of Educational Psychology* 49: 109-77; June 1958.
- WHITE, MARY ALICE, and HARRIS, MYRON W. *The School Psychologist*. New York: Harper & Brothers, 1961. 431 pp.

CHAPTER II

Cultural and Social Factors in Mental Health

CARSON MC GUIRE •

IN THE chapter of the December 1956 REVIEW that corresponds to this one, Allinsmith and Goethals outlined four criteria for mental health. Moreover, they discussed built-in conflicts found in various cultures and examined two meanings of adjustment. In the initial monograph of the Joint Commission on Mental Illness and Health, Jahoda (1958) perceived the possibility of several mental healths in terms of judgments about assets and deficits. Recently, however, Smith (1961) raised questions about value dimensions in the use of multiple criteria. He regarded mental health as a reasonably adequate label for a variety of studies and mapped out both narrow and broad conceptions. Each could be concerned about present behavior, underlying attributes, or future prognoses.

This chapter considers a range of theoretical developments and research reported during the past six years. Each selection in some way falls within the rubric of this chapter. Broad-gauged studies that reflect the influence of cultural and social variables are examined first. The focus then shifts to some more precise inquiries that explore processes. Next, attention is directed toward reports of the Joint Commission on Mental Illness and Health and their implications. Finally, methodological and theoretical questions are raised with reference to future research and the shaping of the educative process which intervenes in the lives of both learner and teacher.

Factors Affecting Illness and Health

Since 1956, somewhat contradictory appraisals of emergent broad-gauged theories have appeared in reviews of empirical research. Hunt (1959) was most critical in his assessment of demographic, ecological, crosscultural, social-stratification, and social-mobility studies. He cautioned against giving causal significance to "culture conflict" and "social isolation" hypotheses regarding the precipitation of mental disorders. In addition to purely environmental-demographic research reports, Scott (1958) examined interpersonal correlates of mental illness and health. He then suggested some possibly relevant dimensions of interactional processes: social

* The author deeply appreciates assistance from Ira Iscoe, Department of Psychology, and Robert F. Peck, Department of Educational Psychology, University of Texas, in the preparation of this chapter. Facilities of the Mental Health in Teacher Education Project, College of Education (supported by Grant No. 2M-6635 from the Training Branch, National Institutes of Health), have been used as well as those of the Laboratory of Human Behavior and the Personality Research Center at the University of Texas.

isolation, degree of involvement of individuals within a particular social system, and differences in socialization procedures employed among various groups.

Clausen (1959) pointed out that a variety of behavioral phenomena, including illness, are only partially culturebound. Certain preferred social responses and institutional forms may be lacking in some cultures or subcultures and elaborated in others. Alternatives to be faced by the individual were postulated by Cohen (1959): (a) conformity *versus* shame and deprivation, (b) participation in or creation of another subculture, or (c) violation of expectations and acceptance of consequent deprivations. In addition, he identified linkages among forms of deviant behavior: for example, acting out and passive withdrawal. Much of the recent literature reflects these divergent points of view.

Crosscultural Studies

Interdisciplinary research of a crosscultural nature, often under the rubric "social psychiatry," has been fostered by the Social Science Research Council. Leighton, Clausen, and Wilson (1957) edited the report of the original committee, which emphasized (a) forces which impinge upon the individual, (b) shared patterns, and (c) the societal impact of mental illness. Looking back on the chapters of the book, the editors recognized that many patterns of human behavior that are regarded as evidence of mental illness in one context are not so defined in another setting. This posed a problem of research strategies that has not yet been solved.

Varied approaches were illustrated in a volume edited by Opler (1959), which focused upon the variable effects of cultural stress upon mental health. Various parts of the book demonstrate the power of cultural analysis. Nevertheless, the fact that individuals with experiences apparently similar to those who showed evidence of psychopathology turned out to be mentally healthy indicates the operation of as yet unidentified dynamic variables. Leighton (1959) presented one possible theoretical framework in the first of three reports of the Stirling County study of psychiatric disorder in a small community in Nova Scotia.

Environmental-Demographic Research

Some of the recent literature rouses a hunger for explanation. For example, Jaco (1960) searched for all first-treated cases of psychoses in Texas during a two-year period. His major findings were that the rate of incidence was greater for females than for males, among the old rather than among the young, in the Anglo-American rather than in the Spanish-American or nonwhite subcultures, in urban areas as contrasted with the rural, and for single and divorced persons compared with married persons.

He also found higher psychotic rates among those in the professional and semiprofessional groups than in other occupational categories, as well as equally high incidence among those with some college as among those having no college education. Some of the foregoing and many other detailed inferences drawn from the survey differed markedly from findings in earlier epidemiologic studies. Jaco attributed this to (a) differences in case-finding methods which included patients receiving private psychiatric treatment; (b) the use of incidence rather than prevalence rates; (c) direct adjustment of the rates for age, sex, and subculture; and (d) the rapid transition in Texas of the risk-population from a rural to an urban economy.

One book has been regarded as a model of clarity and specificity in the conception, design, and reporting of a 10-year community study. Hollingshead and Redlich (1958) headed a research team which focused upon two questions: Is mental illness related to social class? Does a mentally ill patient's position in the status system affect how he or she is treated? The team developed procedures for a psychiatric census and for interviewing and stratifying a 5-percent sample of the population in New Haven, Connecticut. Prevalence of neurotic disorders was more than 60 percent in Classes I-II (upper, upper middle), shifting downward in III (lower middle) and in IV (upper lower), to less than 20 percent in V (lower lower), the remainder within each class being categorized as psychotic. This, the authors noted, could be in part a function of the way the psychiatrist is perceived and utilized. More detailed analyses revealed that the categories of neuroses and types of psychoses varied according to social status. Moreover, effectiveness in securing psychiatric treatment, knowledge of mental illness and its treatment, the acceptance of the mentally ill by relatives, and other factors diminished from Class I to Class V. Hollingshead and Redlich concluded that "Class V needs help most—social and psychiatric—and gets it least" (p. 374).

The Midtown Study, initiated by Rennie in Manhattan, New York City, has been carried on since his death. Langner (1961) dealt with some results of the Sample Survey Operation, which utilized a sample of 1,660 persons drawn from 111,000 residents aged 20-59. A statistic, called the "Ridit," was used to transform classifications by two psychiatrists into a measure of "mental health risk." Factor scores, 0-20, were derived from items related to mental health independently of social status. When factor scores were low, risks were similar for high, medium, and low socioeconomic categories. When high, however, risks were much greater among persons of low socioeconomic status. Thus stress, measured by the cumulative scores for 10 factors in the Midtown Study, could have been cushioned by certain advantages or countered by more resilient personalities of middle and higher status persons. On the other hand, Langner realized, similarly classified stress may not have the same meaning at each level.

Underlying Patterns and Processes

Each essential step in becoming a human being—establishing self-other relationships, learning to use and to respond to symbols, coping with complex motivations and value dilemmas—seems to be loaded with opportunities to acquire various kinds of emotionality (McGuire, 1960). The focuses and intensities of dynamic processes that shape personalities and behavioral patterns apparently differ when experiences with age-mates and more remote adults, in school and elsewhere, are restricted by close-tied parents. Thus family structure and dynamics and certain kinds of antecedent-consequent patterns and processes have to be considered in addition to broad-gauged cultural and social factors.

Family Influences

Some insights into the more subtle factors operating within the family have been provided in recent research. For example, Kohn (1959) used a sampling procedure and interviews to study parental reactions to misbehavior as a function of their values and, in particular, the relation of social class to the exercise of parental authority. Reported reactions of middle and working class parents to eight types of situation were classified into four categories: ignore, scold, divert, punish or coerce. Lower status parents tended to respond in terms of the immediate consequences of the child's actions, with some sharp distinctions drawn for the physical punishment of girls in order to reinforce sex-role expectations. Middle class mothers and fathers apparently reacted in terms of interpretations of the intent they inferred in a boy's or a girl's behavior.

Family patterns associated with adolescent personality structure were explored by Peck (1958) as a part of the Prairie City Study. Four dimensions of family interaction were obtained from a factor analysis of various measures and ratings: consistency, democratic child rearing, mutual trust and approval, and parental severity. Later personality assessments of the 34 subjects who had been studied intensively were sorted into six factors. They were designated as ego strength, superego strength, willing social conformity, spontaneity, friendliness, and hostility-guilt complex. Ego strength, often associated with mental health, appeared to be a consequence of stable consistency as well as a warm, mutual trust and approval not only in the parent-child relationship but also between parents. These findings were elaborated further in a book by Peck and others (1960). They differentiated amoral, expedient, conforming, irrational-conscientious, and rational-altruistic components in a theory of character.

Antecedent-Consequent Patterns

Clinical observations and depth research (such as Peck's) and theories developed from them have suggested a number of hypotheses about the

relation between certain kinds of child rearing and other early experiences, on one hand, and the personality attributes produced by them, on the other. Sears, Maccoby, and Levin (1957), in their well-known *Patterns of Child Rearing*, laid the foundation for a number of follow-up studies which tested such hypotheses. Their data were gathered from interviews with 379 mothers of five-year-old children. Recently, Sears (1961) published a study of the relation between early socialization experiences and later aggressions as measured by six scales administered to 76 boys and 84 girls, aged 12, in a follow-up sample. Much of the evidence supported an expectation, based upon a theory of frustration-induced drive, that the successful inhibition of early forms of aggression tends to produce heightened degrees of aggression anxiety (prosocial) and self-aggression at a later age. Anti-social aggression was related positively to high permissiveness and low punishment, the latter representing a reversal from the earlier years. Social class variability was not explored, since approximately 60 percent of the subjects were from upper middle class families; but there were some important sex differences in the antecedents for aggression anxiety.

Most of the current research is not so neatly designed, at least in terms of a clearly demarked time dimension. Nevertheless, there have been some ingenious studies, using new instruments, which reveal underlying patterns and processes that may modify the influences of obvious social and cultural variables. Winder and Rau (1962), for example, measured social deviance (aggression, dependency, withdrawal, depression) by means of an inventory of peer nomination administered to a population of 710 boys in intermediate grades. After drawing samples to represent three levels of aggression and of dependency, they obtained scores of parental attitudes for 108 fathers and 118 mothers. They found, for instance, that aggression was associated with paternal affection and manipulation of rewards, together with stereotyped sex-role expectations. On the other hand, dependency was related to rejection and sex anxiety on the part of the mother as well as to the father's low self-esteem.

Beliefs and Attitudes

No matter what has been learned or may be uncovered in the future about mental illness and health, certain beliefs and attitudes form a barrier to effective public communication in an area highly charged with anxiety. The University of Illinois studies reported by Nunnally (1961) showed that one major task is "to fill in the voids where people are uninformed." Various methods, each fully described in the book, indicated favorable attitudes toward mental specialists as individuals. Nevertheless, the public appeared to distrust and to devalue treatment methods and institutions. The problem is complicated by factors uncovered by Cohen and Struening (1962), who studied opinions of personnel in two large mental hospitals.

Joint Commission on Mental Illness and Health

The Mental Health Study Act of 1955, a joint resolution of the House and Senate, clearly set forth for the first time the premise that mental health is a matter of grave national concern. With Jack R. Ewalt, M.D., as director, the Joint Commission on Mental Illness and Health, as chosen by the National Institute of Mental Health, rapidly formed task groups to analyze and to evaluate needs and resources. The December 1956 REVIEW, *Mental and Physical Health*, was in large part made possible by grants-in-aid. Since then 8 of 10 monographs have been published, as well as a final report to the U.S. Congress which may have a great impact in years to come.

Each monograph, beginning with the conceptual work of Jahoda (1958), represented a part of the over-all study design. Fein (1958) established a method of calculating direct and indirect costs of mental illness, conservatively estimating them at a minimum of \$3 billion per year. Albee (1959) examined manpower resources, condemned current educational practices, and suggested new strategies necessary to staff the mental health professions. Gurin, Veroff, and Feld (1960) made an intensive study of 2,460 "normal" Americans over 21 years of age. Their sample indicated that nearly one in four had been sufficiently troubled to need help at some time and that one in seven sought it in one way or another. Parenthetically, a follow-up study by Jackson (1962) of the same population revealed that both moderate and sharp status inconsistencies, classified by discrepancies in occupation, education, and racial-ethnic background, were related to the degree of psychological disturbance reported by individuals. Robinson, deMarche, and Wagle (1960) obtained data from the 3,103 counties in the continental United States and selected 15 of these for very intensive field studies. Less than one-fourth had mental health clinics, and few had welfare or health agencies adequately staffed to support and to guide emotionally disturbed persons.

Apparently people in the schools have to work closely with a network of agencies, especially in terms of the manner in which funds are allocated and the necessary mental health personnel are prepared. The report by Robinson, deMarche, and Wagle (1960) pointed out that teachers should be educated to discover mental health problems in their pupils and to make intelligent referrals at early stages. This view was reinforced in a report on the role of schools by Allinsmith and Goethals (1962). They detected five definitions of the curriculum with reference to the promotion of mental health. Despite the contradictions, they believed that teachers could make significant contributions in each of eight areas: namely, detection, limited diagnosis and prognosis, first aid, referral, some approaches to treatment, rehabilitation, follow-up, and intelligent prevention. The authors believed that teachers, unless prepared during teacher education and through in-service activities, should limit themselves to detection

and referral when not in active contact with guidance and counseling personnel and/or with mental health consultants.

The final report of the Joint Commission on Mental Illness and Health (1961), *Action for Mental Health*, incorporated the principal findings of the five-year study and made recommendations that set forth concrete steps to be undertaken at the local, state, and federal levels. This chapter cannot do justice to the volume. Since the summary of recommendations (pp. vii-xxiv) and introduction (pp. xxv-xxxiii) are succinct and the succeeding text is admirably organized and readable, the book is recommended for purchase and careful study.

Mental Health and the Educative Process

Regardless of policy dilemmas and attitudinal conflicts concerning the responsibilities of schools for mental health, there is mounting evidence that noncognitive dimensions are just as important as purely cognitive factors in accounting for educational achievement and for other forms of valued behavior (d'Heurle, Mellinger, and Haggard, 1959; Hoffman, Rosen, and Lippitt, 1960; McGuire and others, 1961; Peck, 1962). Many of the measures used to indicate these dimensions of effectively functioning *versus* borderline and ineffective persons have demonstrated cultural variability (Pierce-Jones, Reid, and King, 1959; McGuire, 1961b). Anti-academic attitudes along with what has been termed the "alienation syndrome" (anxiety, mistrust, pessimism, self-centeredness, and resentment) have appeared in these recent studies as barriers to profitable learning experiences. The latter dimension, alienation, was studied psychologically by Davids and Pildner (1958) and sociologically by Seeman (1959).

Significant advances in theory and methodology recently have begun to appear in research involving school and college populations. The multivariable, multimethod approach was admirably illustrated by Jackson, Getzels, and Xydis (1960). They found that psychological difficulties intruded the cognitive performances of boys during physical maturation and of girls later during the resolution of same-sex, other-sex relationships. The multidimensional theory of behavior with demonstrated "factors in persons" that was presented by McGuire (1961a) supported propositions set forth in the preceding paragraph. In a study of mental health in teacher education, Veldman, Peck, and McGuire (1961) showed that four judges could agree upon underlying factors in their assessments of biographical data, self-reports, and projective instruments.

Each of these examples and others not cited are evidence of the increasing sophistication in theory and research made possible by the availability and wise use of the high-speed computer. Thus the perplexing problem of relating cultural and social variables to intellectual and dynamic elements of personality and behavior may be solved yet. Then more valid

and reasonable explanations and predictions of various facets of mental health and aspects of the educative process should be possible.

Bibliography

- ALBEE, GEORGE W. *Mental Health Manpower Trends*. New York: Basic Books, 1959. 361 pp.
- ALLINSMITH, WESLEY, and GOETHALS, GEORGE W. *The Role of Schools in Mental Health*. New York: Basic Books, 1962. 337 pp.
- CLAUSEN, JOHN A. "The Sociology of Mental Illness." *Sociology Today*. (Edited by R. K. Merton, L. Broom, and L. S. Cottrell, Jr.) New York: Basic Books, 1959. pp. 485-508.
- COHEN, ALBERT K. "The Study of Social Organization and Deviant Behavior." *Sociology Today*. (Edited by R. K. Merton, L. Broom, and L. S. Cottrell, Jr.) New York: Basic Books, 1959. pp. 461-84.
- COHEN, JACOB, and STRUENING, E. L. "Opinions About Mental Illness in the Personnel of Two Large Mental Hospitals." *Journal of Abnormal and Social Psychology* 64: 349-60; May 1962.
- DAVIDS, ANTHONY, and PILDNER, HENRY, JR. "Comparison of Direct and Projective Methods of Personality Assessment Under Different Conditions of Motivation." *Psychological Monographs*: Vol. 72, No. 11 (Whole No. 464), 1958. 30 pp.
- D'HEURLE, ADMA; MELLINGER, JEANNE CUMMINS; and HAGGARD, ERNEST A. "Personality, Intellectual, and Achievement Patterns in Gifted Children." *Psychological Monographs*: Vol. 73, No. 13 (Whole No. 483), 1959. 28 pp.
- FEIN, RASHI. *Economics of Mental Illness*. New York: Basic Books, 1958. 164 pp.
- GURIN, GERALD; VEROFF, JOSEPH; and FELD, SHEILA. *Americans View Their Mental Health: A Nationwide Interview Survey*. New York: Basic Books, 1960. 444 pp.
- HOFFMAN, LOIS WLADIS; ROSEN, SIDNEY; and LIPPITT, RONALD. "Parental Coerciveness, Child Autonomy, and Child's Role at School." *Sociometry* 23: 15-22; March 1960.
- HOLLINGSHEAD, AUGUST B., and REDLICH, FREDERICK C. *Social Class and Mental Illness: A Community Study*. New York: John Wiley & Sons, 1958. 442 pp.
- HUNT, RAYMOND G. "Socio-Cultural Factors in Mental Disorder." *Behavioral Science* 4: 96-106; April 1959.
- JACKSON, ELTON F. "Status Consistency and Symptoms of Stress." *American Sociological Review* 27: 469-80; August 1962.
- JACKSON, PHILIP W.; GETZELS, JACOB W.; and XYDIS, GEORGE A. "Psychological Health and Cognitive Functioning in Adolescence: A Multivariate Analysis." *Child Development* 31: 285-98; June 1960.
- JACO, E. GARTLY. *The Social Epidemiology of Mental Disorders: A Psychiatric Survey of Texas*. New York: Russell Sage Foundation, 1960. 228 pp.
- JAHODA, MARIE. *Current Conceptions of Positive Mental Health*. New York: Basic Books, 1958. 136 pp.
- JOINT COMMISSION ON MENTAL ILLNESS AND HEALTH. *Action for Mental Health*. New York: Basic Books, 1961. 338 pp.
- KOHN, MELVIN L. "Social Class and the Exercise of Parental Authority." *American Sociological Review* 24: 352-66; June 1959.
- LANGNER, THOMAS S. "Environmental Stress and Mental Health." *Comparative Epidemiology of the Mental Disorders*. (Edited by Paul H. Hoch and Joseph Zubin.) New York: Grune & Stratton, 1961. pp. 32-44.
- LEIGHTON, ALEXANDER H. *My Name Is Legion: Foundations for a Theory of Man in Relation to Culture*. New York: Basic Books, 1959. 452 pp.
- LEIGHTON, ALEXANDER H.; CLAUSEN, JOHN A.; and WILSON, ROBERT N., editors. *Explorations in Social Psychiatry*. New York: Basic Books, 1957. 452 pp.
- MCGUIRE, CARSON. "Foundations of Emotional Development." *Texas State Journal of Medicine* 56: 723-25; September 1960.
- MCGUIRE, CARSON. "The Prediction of Talented Behavior in the Junior High School." *Proceedings of the 1960 Invitational Conference on Testing Problems*. Princeton, N.J.: Educational Testing Service, 1961. pp. 46-73. (a)

- McGUIRE, CARSON. "Sex Role and Community Variability in Test Performances." *Journal of Educational Psychology* 52: 61-73; April 1961. (b)
- McGUIRE, CARSON, and OTHERS. "Dimensions of Talented Behavior." *Educational and Psychological Measurement* 21: 3-38; Spring 1961.
- NUNNALLY, JUM C., JR. *Popular Conceptions of Mental Health*. New York: Holt, Rinehart and Winston, 1961. 311 pp.
- OPLER, MARVIN K., editor. *Culture and Mental Health: Cross-Cultural Studies*. New York: Macmillan Co., 1959. 533 pp.
- PECK, ROBERT F. "Family Patterns Correlated with Adolescent Personality Structure." *Journal of Abnormal and Social Psychology* 57: 347-50; November 1958.
- PECK, ROBERT F. "Student Mental Health: The Range of Personality Patterns in a College Population." *Personality Factors on the College Campus*. (Edited by Robert L. Sutherland and others.) Austin, Tex.: Hogg Foundation for Mental Health, University of Texas, 1962. Chapter 9, pp. 161-99.
- PECK, ROBERT F., and OTHERS. *The Psychology of Character Development*. New York: John Wiley & Sons, 1960. 267 pp.
- PIERCE-JONES, JOHN; REID, JACKSON B.; and KING, F. J. "Adolescent Racial and Ethnic Group Differences in Social Attitudes and Adjustment." *Psychological Reports* 5: 549-52; December 1959.
- ROBINSON, REGINALD; DEMARCHE, DAVID F.; and WAGLE, MILDRED K. *Community Resources in Mental Health*. New York: Basic Books, 1960. 435 pp.
- SCOTT, WILLIAM A. "Social Psychological Correlates of Mental Illness and Mental Health." *Psychological Bulletin* 55: 65-87; March 1958.
- SEARS, ROBERT R. "Relation of Early Socialization Experiences to Aggression in Middle Childhood." *Journal of Abnormal and Social Psychology* 63: 466-92; November 1961.
- SEARS, ROBERT R.; MACCOBY, ELEANOR E.; and LEVIN, HARRY. *Patterns of Child Rearing*. Evanston, Ill.: Row, Peterson and Co., 1957. 549 pp.
- SEEMAN, MELVIN. "On the Meaning of Alienation." *American Sociological Review* 24: 783-91; December 1959.
- SMITH, M. BREWSTER. "'Mental Health' Reconsidered: A Special Case of the Problem of Values in Psychology." *American Psychologist* 16: 299-306; June 1961.
- VELDMAN, DONALD J.; PECK, ROBERT F.; and MCGUIRE, CARSON. "Measuring the Value Systems of Education Professors." *Journal of Educational Psychology* 52: 330-34; December 1961.
- WINDER, C. L., and RAU, LUCY. "Parental Attitudes Associated with Social Deviance in Preadolescent Boys." *Journal of Abnormal and Social Psychology* 64: 418-24; June 1962.

CHAPTER III

Factors Influencing Individual Mental Health

TED LANDSMAN

A MAJOR highlight in mental health planning of the six-year period covered by this REVIEW was the presentation of the final report of the Joint Commission on Mental Illness and Health (1961) to the U.S. Congress, governors, and legislatures. The action program recommended in the report emphasized not only research but basic research in contrast to applied research. The Joint Commission separated the period's research into two areas which parallel the basic-applied continuum: research in biological and psychopharmacological bases and research in family patterns, with emphasis on the schizophrenogenic parent.

A vast area of research in psychological and personality processes can be seen as basic to the study of mental health and, as such, continues to be supported, particularly by the National Institute of Mental Health (1959, 1960, 1961). This area covers such subjects as mental processes, personality development, perception, motivation, and learning. This chapter, however, is limited to those studies that bear directly upon mental health factors.

Maternal Patterns

Mothers are more likely to receive blame than reward for the outcomes of child rearing. Klatskin, Jackson, and Wilkin (1956) connected maternal deviations in sleep management of children with problem behavior in the first year. The study also indicated that feeding, toilet training, and socialization practices seem to be responsible for problem behavior in the second and third years.

The persistent post World War II trend toward employment of mothers worried many social welfare agencies. Some research on the problem has emerged, notably the studies of Yarrow (1961) which centered upon 50 working and 50 nonworking mothers. Specific child rearing practices differed little between the two groups. However, those mothers who preferred to work but did not because of a sense of duty seemed to have the greatest problems in dealing with their children. Studies by Nye (1959) and Hoffman (1961) support these conclusions.

The National Institute of Mental Health (1960) also made studies which signified that early acceptance of the infant by the mother is important to his adjustment, particularly between the years of 9 and 12.

These investigations suggested that the specific permissiveness or constraint of the mother is less important than her basic acceptance of the child. Bayley and Schaefer (1960) reported continued significance of the maternal role. Both boys and girls in the study paralleled their mothers' behavioral patterns before the age of 3, while after 3 the girls began to differ in behavior from their mothers. The mother's behavioral patterns and the family's socioeconomic status were highly predictive of the child's adjustment. Altman (1958) studied mothers of 51 normal, latency-age children and concluded that children of the more stable mothers were more expansive and vigorous, both intellectually and emotionally, than were children of the less stable mothers. The significance of feeding in infancy was emphasized by Brody (1956) in one of the more comprehensive reports on maternal influences. Centering their study upon 450 children referred to the Institute for Juvenile Research, Rosenthal and others (1959) stressed the role of maternal defenses in mother-child relationships resulting in problem behavior of the child. Mason (1958) defined a pattern of hostility and aggression and an inability to grant independence as characteristic of mothers of drug addicts. Thus, while the hypothesis concerning the mother's central role in the mental health of the child continues in general to be supported by many studies, a single or even unified group of maternal patterns has not yet emerged from the literature.

Schizophrenogenic Mothers

The role of mothers was a promising area of research for investigators interested in the etiology of schizophrenia, the largest category of mental illness. Winder and Kantor (1958) found schizophrenogenic mothers to be immature. Dworin and Wyant (1957) discerned a pattern of domineering, smothering, and demanding behavior on the part of mothers of schizophrenic subjects in therapy. Unresolved independence-dependence on the part of sons of such mothers is often apparent. Schizophrenic daughters more frequently see their mothers as exercising authoritarian control than do normals, according to Heilbrun (1960).

Two studies cast doubt upon the existence of the schizophrenogenic mother. Zuckerman, Oltean, and Monashkin (1958) could not support their hypothesis that mothers of schizophrenics have more severe parental attitudes than do mothers of normals. Klebanoff (1959) found that mothers of schizophrenic children showed less, rather than more, pathological attitudes than mothers of brain-damaged or retarded children. Because the hypothesis of the schizophrenogenic mother has thus been placed in doubt by several studies, investigators have begun to look for multiple causation of the occurrence of schizophrenia. Analyses of the role of family constellations and the placing of the father into the circle of suspicion are now being undertaken.

Role of the Family

In a study reported by Jackson and others (1958), 20 psychiatric specialists attempted to distinguish the schizophrenogenic father and mother. Low level of agreement was noted concerning the conception of the father as defeated, autocratic, and chaotic, while better over-all agreement was found in the characterization of the mother as puritanical, helpless, and Machiavellian. Esman, Kohp, and Nyman (1959) failed to find a particular family pattern in 11 families with schizophrenic children. However, Lidz and others (1957) discovered seriously disturbed marital relationships in 14 families with schizophrenic offspring. Familial genesis was also discerned in a study by McCord, Porta, and McCord (1962). Utilizing 2,145 stepchildren, an unusually large sample, Bowerman and Irish (1962) presented evidence to show that homes involving step relationships were more likely to hold stress ambivalence and low cohesiveness than normal homes. Other parental patterns noted by investigators as related to schizophrenia or serious disturbance included (a) disharmonious parental relationships (Fisher and others, 1959); (b) rigidity and self-deception (Perr, 1958); (c) adjustment problems (Peterson and others, 1959); and (d) arbitrariness and parental maladjustment (Kaufman and others, 1960).

Additional References: Becker and others (1959); Block and others (1958); Ehrenwald (1960); Fisher and Mendell (1956); Gray (1959); Greenfield (1959); Káufman and others (1958); Myers and Roberts (1959); Nakamura (1959); Peterson and others (1961); Rosenbaum (1961); Rouman (1956); Schofield and Balian (1959); Vogel (1960); Watson (1957).

Role of Siblings and Peers

Ordinal position has long fascinated behavioral scientists; additional studies in this area during the past six years have continued to be of significance for mental health. Sampson (1962) found that first-born peers showed a higher need for achievement, while first-born females showed greater resistance to influence than their later-born counterparts. In a study of 250 Haryard students, McArthur (1956) reported that the first child tended to be adult oriented and sensitively serious, while the second child was oriented with easygoing friendliness. Grosz and Miller (1958), studying 156 schizophrenic patients in three-sibling families, reported that no ordinal position appeared to carry specific vulnerability to schizophrenia. Childhood friends were found to be lacking among psychotics, and a higher rate of childhood friends existed among normals, according to Lantz (1956). Schooler (1961) found that more female schizophrenic patients came from the last half of their sibling group than from the first half.

Additional References: Bossard and Boll (1956); Rosenthal (1959); Stotland and Cottrell (1962).

Effects of Separation

No matter what the impact of defective mothering upon mental health, it appears that separation of any kind is likely to have its effect on the child. Berg and Cohen (1959) demonstrated greater frequency of separation from the mother in childhood among schizophrenic females than among neurotic females.

In an unusually pertinent study with monkeys, Jensen and Tolman (1962) confirmed the significance of togetherness in mother-child pairs by demonstrating that mothers were specific to their own infants but that children learned to be own-mother specific only after repeated separation and interaction with an unfamiliar mother. A study of father absence in Norwegian-sailor families by Lynn and Sawrey (1959) pointed out immaturity and poor peer adjustment among father-absent boys.

Lidz and others (1957) studied a group of families in which schizophrenics were reared and found not a single one to be well integrated. All of the marriages were seriously disturbed or torn by the necessity that one spouse passively accept the pathological behavior of the other.

Mental Health in Childhood Periods

Autism and childhood schizophrenia remain entities which challenge serious research. Factors associated with this pattern include (a) fear of annihilation (Kaufman and others, 1957) and (b) biological disturbances (Fish, 1959). Freedman and Bender (1957) found that six child schizophrenics grew up to be adult schizophrenics. The approach-avoidance conflict theory was presented by Phillips (1957) as a new theoretical basis for understanding the disease.

Asthma is perhaps the most pervasive problem to be linked with mental health. Fitzelle (1959) found elevated psychopathic scores for mothers of asthmatic children, while Harris and Shure (1956) reported no evidence of intensified symptoms of disturbed behavior in the asthmatic group.

Additional References: Brody (1958); Cattell and Coan (1957); Cattell, Coan, and Beloff (1958); O'Neal and Robins (1958).

Soft Mothers

No review of parent factors on mental health would be complete without a report of the startling studies of Harlow (1958, 1959) and of Harlow and Woolsey (1958), who reared baby monkeys with two kinds of artificial mothers, one made principally of wire, the other of foam rubber. The clear preference of the infants for the soft mothers and their subsequent superior adjustment even on into monkey adulthood established, at least for monkeys, the significance of frequent and intimate body contact

between mother and infant. Harlow found that those separated from their mothers and isolated from other monkeys showed extreme social abnormalities. In addition, those monkeys reared with wire mothers became themselves "helpless, hopeless, heartless mothers devoid of any maternal feeling." The study is also of considerable methodological significance in light of the educator's frequent assertion of the meaninglessness of animal research. Harlow's studies have, more than those of any other comparative psychologists, demonstrated the possibility of significant exploration through primate research.

Biochemical Factors

Perhaps the most distinctive development in mental health research in recent years has been the optimism concerning the expected discovery of a biochemical basis for schizophrenia and other psychoses. Studies in this area far outnumber those of social or family roles in mental health; no doubt the amount of federal funds in this area is also substantially greater. The promising studies isolating taraxein from the blood of schizophrenics were seriously questioned when Siegel and others (1959) found themselves unable to obtain replications of the results. Mann and LaBrosse (1959) found that the differences in urinary excretion of phenolic acids by schizophrenic patients, reported in a previous study, were due simply to the coffee-drinking habits of the patients. The role of defects in the metabolism of circulating epinephrine as well as other biochemical effects were described with similar cautions by Kety (1959).

Blood plasma research, which still shows possibilities, continues. Presence or absence of schizophrenia was predicted with some accuracy by Frohmann and others (1958) on the basis of a factor which alters carbohydrate metabolism of red cells. The studies of Scheinberg and others (1957) and Abood, Gibbs, and Gibbs (1957) raised doubts about the significance of measurement of concentration of ceruloplasmin. Similarly, Antebi and King (1962) reported no diagnostic value in the estimation of serum enzyme activity. Feldstein, Hoagland, and Freeman (1959) found no causal relationship between serotonin metabolism and chronic schizophrenia. Negative results were reported by Wortis (1959) concerning the effects of serum drawn from patient groups on rat brain oxidative activity and by Barak, Humoller, and Stevens (1958) concerning the testing of blood glutathione levels.

Despite controversial results, Sprince and others (1961) suggested continued research on indole metabolism in mental illness. Similarly, serotonin and tryptamine continue to be studied in view of persistent reports, clinical and otherwise, of their significance in mental illness. Aprison and Ferster (1961) showed behavioral changes associated with the level of serotonin in the brain. Other substances explored in relationship to mental

health include epinephrine, norepinephrine, and the whole range of psychotomimetic or psychotropic drugs. These are listed in a report by the U.S. Department of Health, Education, and Welfare, Public Health Service (1962). Some illustrative biochemical studies include those on (a) LSD-25 (Anastasopoulos and Photiades, 1962; and Aronson, Watermann, and Klee, 1962); (b) chlorpromazine and reserpine (Gonzalez and Shepp, 1962); (c) methylphenidate (Froelich and Heckel, 1962); (d) ACTH (Miller and Ogawa, 1962); (e) hydrocorticosteroid levels (Co Tui, Riley, and Orr, 1956); (f) reserpine (Arnold and Freeman, 1956; and Pearl and others, 1956); and (g) catecholamines (Axelrod and others, 1961).

For the nonmedical reader, a series of summaries on the significance of biochemical factors in mental health may be helpful: Abramson (1956), Fisher (1959), Rinkel and others (1958), McDonald (1958), Kety (1959), and Rubin (1959).

There seems to be sufficient clinical and experimental evidence to demand continued exploration of biochemical origins of mental illness. However, the earlier enthusiasm seems to have been somewhat tempered by the contradictory results of various investigators. Both blood-fraction research and enzyme activity seem particularly promising in this area, and with increased precision in methodology the biochemical bases of psychoses may become increasingly clear in coming years.

Perceptual Causation

Exploration of the genesis of mental health through perceptual processes is perhaps one of the major areas of research with sophisticated theoretical bases. Eysenck, Granger, and Brengelmann (1957) found that a series of objective perceptual tests differentiated at reasonably high levels among groups of psychotics, neurotics, and normals. After differentiating among schizophrenics in good contact with reality, those in poor contact, and normals in a size-constancy experiment, Lovinger (1956) suggested that basic perceptual processes are involved in schizophrenia. Schizophrenics made significantly more errors in a space-perception task as reported by Hozier (1959). Zimet and Fine (1959) obtained differences between process and reactive schizophrenics in levels of perceptual organization as tested by the Rorschach technique. Similar use of perceptual differences was found by Weckowicz and Blewett (1959), and by Dixon and Lear (1962).

Additional References: Friedman (1958); Lang and Luoto (1962); McReynolds and Collins (1961); Weckowicz and Hall (1960).

Sensory Deprivation

Perhaps the most significant psychological process with the broadest implications for all areas of mental health is sensory deprivation. Rosen-

zweig (1959) summarized the implications for an analogy between sensory deprivation and schizophrenia. Wexler and others (1958) reported that male volunteers who were subjected to perceptual and sensory deprivation through the use of a tank-type respirator all showed degrees of anxiety, distortions in time judgment, and impaired ability to concentrate. In brief isolation procedures, Cohen and others (1959) demonstrated the occurrence of more simple hallucinatory responses than those reported in studies requiring longer periods of isolation. Wase and Christensen (1960) added a new dimension to this area by demonstrating a significant lowering in phospholipid metabolism in the brains of isolated mice. However, patients tested by Gibby and Adams (1961) were more receptive after partial sensory deprivation.

General Summary and Evaluation

Perhaps the most dramatic and rapidly developing area of mental health research of the past six years is that concerning the biochemical or psychopharmacological aspects of mental health. The responsibilities and the demands for such research were illustrated by Loranger, Prout, and White (1961).

Behaviorial scientists have long and unsuccessfully struggled with basic problems of research design which they thought were well handled by the physical and biological sciences—size and representativeness of sample, controls and precision in measurement. The importance of careful design of experiments is consistently overlooked in drug research and in biochemical research, where it would appear that problems in design might more easily be solved. Preferences still seem to be for small conveniently selected samples of from 8 to 15 subjects in some instances. Nevertheless, the development of more accurate methods and tighter controls is occurring, and it seems almost safe to say that the coming years will bring increasingly significant information concerning the biochemical and physiological structure of behavior.

Research on family origins of mental illness which has centered on the role of the mother seems to be shifting to a greater concern with family environment, including the socioeconomic conditions and the inter-related roles of father and mother. In view of the difficulties in securing families as subjects, one can only applaud the improvement in methods of control in these studies. Perhaps the major methodological problems lie in the development of more nearly precise criterion instruments and more nearly precise measurement approaches in general.

Future research seems headed for (a) psychochemical research which would explore the effect of psychological events such as parental rejection upon the biochemical processes in the organism and (b) the long-awaited explorations of positive mental health concepts such as those urged by Jourard (1959) and Jahoda (1958).

Two competing theoretical structures seem to be emerging: (a) the learning theory approach, illustrated by Mednick (1958), and (b) the existential direction, described by Kotchen (1960). Considerable interest in both theories is already apparent. It is anticipated that the constructs currently being presented will be experimentally tested with creative, advanced designs and with more nearly precise methodology.

Bibliography

- ABOOD, L. G.; GIBBS, F. A.; and GIBBS, E. "Comparative Study of Blood Ceruloplasmin in Schizophrenia and Other Disorders." *Archives of Neurology and Psychiatry* 77: 643-45; June 1957.
- ABRAMSON, HAROLD A., editor. *Neuropharmacology: Transactions of the Second Conference*. New York: Josiah Macy, Jr., Foundation, 1956. 328 pp.
- ALTMAN, CHARLOTTE H. "Relationships Between Maternal Attitudes and Child Personality Structure." *American Journal of Orthopsychiatry* 28: 160-69; January 1958.
- ANASTASOPOULOS, GEORGE, and PHOTIADES, HARRY. "Effects of LSD-25 on Relatives of Schizophrenic Patients." *Journal of Mental Science* 108: 95-98; January 1962.
- ANTEBI, R. N., and KING, J. "Serum Enzyme Activity in Chronic Schizophrenia." *Journal of Mental Science* 108: 75-79; January 1962.
- APRISON, M. H., and FERSTER, C. B. "Correlation of Brain Monoamine Oxidase Activity with Behavioural Changes After Iproniazid and 5-Hydroxytryptophan Administration." *Journal of Neurochemistry* 6: 350-57; May 1961.
- ARNOLD, ARTHUR LEMON, and FREEMAN, HARRY. "Reserpine in Hospitalized Psychotics: A Controlled Study on Chronically Disturbed Women." *Archives of Neurology and Psychiatry* 76: 281-85; September 1956.
- ARONSON, H.; WATERMANN, C. E.; and KLEE, G. D. "The Effect of d-Lysergic Acid Diethylamide (LSD-25) on Learning and Retention." *Journal of Clinical and Experimental Psychopathology* 23: 17-23; March 1962.
- AXELROD, JULIUS, and OTHERS. "Lack of Uptake of Catecholamines After Chronic Denervation of Sympathetic Nerves." *Nature* 189: 66; January 1961.
- BARAK, ANTHONY J.; HUMOLLER, FRED L.; and STEVENS, JOHN D. "Blood Glutathione Levels in the Male Schizophrenic Patient." *Archives of Neurology and Psychiatry* 80: 237-40; August 1958.
- BAYLEY, NANCY, and SCHAEFER, EARL S. "Relationships Between Socioeconomic Variables and the Behavior of Mothers Toward Young Children." *Journal of Genetic Psychology* 96: 61-77; March 1960.
- BERG, MORTON, and COHEN, BERNARD B. "Early Separation from the Mother in Schizophrenia." *Journal of Nervous and Mental Disease* 128: 365-69; April 1959.
- BOWERMAN, CHARLES E., and IRISH, DONALD P. "Some Relationships of Stepchildren to Their Parents." *Marriage and Family Living* 24: 113-21; May 1962.
- BRODY, SYLVIA. *Patterns of Mothering: Maternal Influence During Infancy*. New York: International Universities Press, 1956. 446 pp.
- COHEN, BERTRAM D., and OTHERS. "Sensory Isolation: Hallucinogenic Effects of a Brief Procedure." *Journal of Nervous and Mental Disease* 129: 486-91; November 1959.
- CO TUI; RILEY, E.; and ORR, A. "17-Hydrocorticosteroid Levels in the Peripheral Blood of Psychotic Patients Under Treatment with Chlorpromazine and Reserpine." *Journal of Clinical and Experimental Psychopathology* 17: 142-46; June 1956.
- DIXON, N. F., and LEAR, T. E. "Perceptual Regulation and Mental Disorder." *Journal of Mental Science* 108: 356-61; May 1962.
- DWORIN, JACK, and WYANT, OAKLEY. "Authoritarian Patterns in the Mothers of Schizophrenics." *Journal of Clinical Psychology* 13: 332-38; October 1957.
- ESMAN, AARON H.; KOHN, MARTIN; and NYMAN, LAWRENCE. "Parents of Schizophrenic Children: Workshop, 1958: 2. The Family of the 'Schizophrenic' Child." *American Journal of Orthopsychiatry* 29: 455-59; July 1959.
- EYSENCK, H. J.; GRANGER, G. W.; and BRINGELMANN, J. C. *Perceptual Processes and Mental Illness*. New York: Basic Books, 1957. 144 pp.

- FELDSTEIN, AARON; HOAGLAND, HUDSON; and FREEMAN, HARRY. "Blood and Urinary Serotonin and 5-Hydroxyindole Acetic Acid Levels in Schizophrenic Patients and Normal Subjects." *Journal of Nervous and Mental Disease* 129: 62-68; July 1959.
- FISH, BARBARA. "Longitudinal Observations of Biological Deviations in a Schizophrenic Infant." *American Journal of Psychiatry* 116: 25-31; July 1959.
- FISHER, SEYMOUR, editor. *Child Research in Psychopharmacology*. Springfield, Ill.: Charles C. Thomas, 1959. 232 pp.
- FISHER, SEYMOUR, and OTHERS. "Parents of Schizophrenics, Neurotics, and Normals." *Archives of General Psychiatry* 1: 149-66; August 1959.
- FITZELLE, GEORGE T. "Personality Factors and Certain Attitudes Toward Child Rearing Among Parents of Asthmatic Children." *Psychosomatic Medicine* 21: 208-17; May-June 1959.
- FREEDMAN, ALFRED M., and BENDER, LAURETTA. "When the Childhood Schizophrenic Grows Up." *American Journal of Orthopsychiatry* 27: 553-62; July 1957.
- FROELICH, ROBERT E., and HECKEL, ROBERT V. "The Psychological Effects of Methylphenidate." *Journal of Clinical and Experimental Psychopathology* 23: 91-98; June 1962.
- FROHMANN, C. E., and OTHERS. "Ceruloplasmin, Transferrin and Tryptophan in Schizophrenia." *Archives of Neurology and Psychiatry* 79: 730-34; June 1958.
- GIBBY, ROBERT G., and ADAMS, HENRY B. "Receptiveness of Psychiatric Patients to Verbal Communication: An Increase Following Partial Sensory and Social Deprivation." *Archives of General Psychiatry* 5: 266-70; October 1961.
- GONZALEZ, R. C., and SHEPP, BRYAN. "The Effects of Chlorpromazine on Instrumental Learning Based on Conditioned Fear." *Canadian Journal of Psychology* 16: 64-71; March 1962.
- GROSZ, HANUS J., and MILLER, IRVING. "Sibling Patterns in Schizophrenia." *Science* 128: 30; July 1958.
- HARLOW, HARRY F. "The Nature of Love." *American Psychologist* 13: 673-85; December 1958.
- HARLOW, HARRY F. "Basic Social Capacity of Primates." *Human Biology* 31: 40-53; February 1959.
- HARLOW, HARRY F., and WOOLSEY, CLINTON N., editors. *Biological and Biochemical Bases of Behavior*. Madison: University of Wisconsin Press, 1958. 476 pp.
- HARRIS, M. COLEMAN, and SHURE, NORMAN. "A Study of Behavior Patterns in Asthmatic Children." *Journal of Allergy* 27: 312-23; July 1956.
- HEILBRUN, ALFRED B., JR. "Perception of Maternal Child Rearing Attitudes in Schizophrenics." *Journal of Consulting Psychology* 24: 169-73; April 1960.
- HOFFMAN, LOIS WLADIS. "Effects of Maternal Employment on the Child." *Child Development* 32: 187-97; March 1961.
- HOZIER, ANN. "On the Breakdown of the Sense of Reality: A Study of Spatial Perception in Schizophrenia." *Journal of Consulting Psychology* 23: 185-94; June 1959.
- JACKSON, DON D., and OTHERS. "Psychiatrists' Conceptions of the Schizophrenogenic Parent." *Archives of Neurology and Psychiatry* 79: 448-59; April 1958.
- JAHODA, MARIE. *Current Concepts of Positive Mental Health*. New York: Basic Books, 1958. 136 pp.
- JENSEN, GORDON D., and TOLMAN, CHARLES W. "Mother-Infant Relationship in the Monkey, *Macaca Nemestrina*: The Effect of Brief Separation and Mother-Infant Specificity." *Journal of Comparative and Physiological Psychology* 55: 131-36; February 1962.
- JOINT COMMISSION ON MENTAL ILLNESS AND HEALTH. *Action for Mental Health*. New York: Basic Books, 1961. 338 pp.
- JOURARD, SIDNEY M. "Healthy Personality and Self-Disclosure." *Mental Hygiene* 43: 499-507; October 1959.
- KAUFMAN, IRVING, and OTHERS. "Childhood Psychosis: I. Childhood Schizophrenia: Treatment of Children and Parents." *American Journal of Orthopsychiatry* 27: 683-90; October 1957.
- KAUFMAN, IRVING, and OTHERS. "Treatment Implications of a New Classification of Parents of Schizophrenic Children." *American Journal of Psychiatry* 116: 920-24; April 1960.

- KETY, SEYMOUR S. "Biochemical Theories of Schizophrenia." Part I. *Science* 129: 1528-32; June 5, 1959.
- KLATSKIN, ETHELYN H.; JACKSON, EDITH B.; and WILKIN, LOUISE C. "The Influence of Degree of Flexibility in Maternal Care Practices on Early Childhood Behavior." *American Journal of Orthopsychiatry* 26: 79-93; January 1956.
- KLEBANOFF, LEWIS B. "Parents of Schizophrenic Children: Workshop, 1958: 1. Parental Attitudes of Mothers of Schizophrenic, Brain-Injured and Retarded, and Normal Children." *American Journal of Orthopsychiatry* 29: 445-54; July 1959.
- KOTCHEN, THEODORE A. "Existential Mental Health: An Empirical Approach." *Journal of Individual Psychology* 16: 174-81; November 1960.
- LANTZ, HERMAN R. "Number of Childhood Friends as Reported in the Life Histories of a Psychiatrically Diagnosed Group of 1000." *Marriage and Family Living* 18: 107-108; May 1956.
- LIDZ, THEODORE, and OTHERS. "The Intrafamilial Environment of Schizophrenic Patients: II. Marital Schism and Marital Skew." *American Journal of Psychiatry* 114: 241-48; September 1957.
- LORANGER, ARMAND W.; PROUT, CURTIS T.; and WHITE, MARY ALICE. "The Placebo Effect in Psychiatric Drug Research." *Journal of the American Medical Association* 176: 920-25; June 17, 1961.
- LOVINGER, EDWARD. "Perceptual Contact with Reality in Schizophrenia." *Journal of Abnormal and Social Psychology* 52: 87-91; January 1956.
- LYNN, DAVID B., and SAWREY, WILLIAM L. "The Effects of Father-Absence on Norwegian Boys and Girls." *Journal of Abnormal and Social Psychology* 59: 258-62; September 1959.
- MARTHUR, CHARLES. "Personalities of First and Second Children." *Psychiatry* 19: 47-54; February 1956.
- MCCORD, WILLIAM; PORTA, JUDITH; and MCCORD, JOAN. "The Familial Genesis of Psychoses." *Psychiatry* 25: 60-71; February 1962.
- MCDONALD, ROGER K. "Problems in Biologic Research in Schizophrenia." *Journal of Chronic Diseases* 8: 366-71; September 1958.
- MANN, JAY D., and LABROSSE, ELWOOD H. "Urinary Excretion of Phenolic Acids by Normal and Schizophrenic Male Patients." *Archives of General Psychiatry* 1: 547-51; November 1959.
- MASON, PERCY. "The Mother of the Addict." *Psychiatric Quarterly Supplement* 32: 189-99; 1958.
- MEDNICK, SARNOFF A. "A Learning Theory Approach to Research in Schizophrenia." *Psychological Bulletin* 55: 316-27; September 1958.
- MILLER, ROBERT E., and OGAWA, NOBUYA. "The Effect of Adrenocorticotrophic Hormone (ACTH) on Avoidance Conditioning in the Adrenalectomized Rat." *Journal of Comparative Physiological Psychology* 55: 211-13; April 1962.
- NATIONAL INSTITUTE OF MENTAL HEALTH. *Highlights of Progress in Mental Health Research*. Washington, D.C.: Government Printing Office. 1959, 40 pp.; 1960, 51 pp.; 1961, 43 pp.
- NYE, F. IVAN. "Employment Status of Mothers and Adjustment of Adolescent Children." *Marriage and Family Living* 21: 240-44; August 1959.
- PEARL, DAVID, and OTHERS. "The Effects of Reserpine on Schizophrenic Patients." *American Journal of Psychiatry* 112: 936; May 1956.
- PERR, HERBERT M. "Criteria Distinguishing Parents of Schizophrenic and Normal Children: An Initial Study with the Interpersonal Diagnostic System." *Archives of Neurology and Psychiatry* 79: 217-24; February 1958.
- PETERSON, DONALD R., and OTHERS. "Parental Attitudes and Child Adjustment." *Child Development* 30: 119-30; March 1959.
- PHILLIPS, E. LAKIN. "Contributions to a Learning Theory Account of Childhood Autism." *Journal of Psychology* 43: 117-24; January 1957.
- RINKEL, MAX, and OTHERS, editors. *Chemical Concepts of Psychosis*. New York: Ivan Obolensky, 1958. Vol. 21, 485 pp.
- ROSENTHAL, M. J., and OTHERS. "A Study of Mother-Child Relationships in the Emotional Disorders of Children." *Genetic Psychology Monographs* 60: 65-116; August 1959.
- ROSENZWEIG, NORMAN. "Sensory Deprivation and Schizophrenia: Some Clinical and Theoretical Similarities." *American Journal of Psychiatry* 116: 326-29; October 1959.

- RUBIN, LEONARD S. "Recent Advances in the Chemistry of Psychotic Disorders." *Psychological Bulletin* 56: 375-83; September 1959.
- SAMPSON, EDWARD E. "Birth Order, Need Achievement, and Conformity." *Journal of Abnormal and Social Psychology* 64: 155-59; February 1962.
- SCHEINBERG, I. HERBERT, and OTHERS. "Concentration on Ceruloplasmin in Plasma of Schizophrenic Patients." *Science* 126: 925-26; November 1957.
- SCHOOLER, CARMEL. "Birth Order and Schizophrenia." *Archives of General Psychiatry* 4: 91-97; January 1961.
- SIEGEL, MALCOLM, and OTHERS. "Taraxein, Fact or Artifact." *American Journal of Psychiatry* 115: 819-20; March 1959.
- SPRINCE, HERBERT, and OTHERS. "Detection and Isolation of Indoleacetamide from Human Urine: Results with Schizophrenic and Normal Subjects." *Journal of Laboratory and Clinical Medicine* 57: 763-70; May 1961.
- U.S. DEPARTMENT OF HEALTH, EDUCATION, and WELFARE, PUBLIC HEALTH SERVICE. "A Selective List of Drugs Used in Psychiatry." *Psychopharmacology Service Center Bulletin* 2: 1-36; March 1962.
- WASE, ARTHUR W., and CHRISTENSEN, JENS. "Stimulus Deprivation and Phospholipid Metabolism in Cerebral Tissue." *Archives of General Psychiatry* 2: 171-73; February 1960.
- WECKOWICZ, T. E., and BLEWETT, D. B. "Size Constancy and Abstract Thinking in Schizophrenic Patients." *Journal of Mental Science* 105: 909-34; October 1959.
- WEXLER, DONALD, and OTHERS. "Sensory Deprivation: A Technique for Studying Psychiatric Aspects of Stress." *Archives of Neurology and Psychiatry* 79: 225-33; February 1958.
- WINDER, C. L., and KANTOR, ROBERT E. "Rorschach Maturity Scores of the Mothers of Schizophrenics." *Journal of Consulting Psychology* 22: 438-40; December 1958.
- WORTIS, JOSEPH. "Serum Toxicity in Various Psychiatric Disorders." *American Journal of Psychiatry* 116: 309-11; October 1959.
- YARROW, MARIAN RADKE. "Maternal Employment and Child Rearing." *Children* 8: 223-28; November-December 1961.
- ZIMET, CARL N., and FINE, HAROLD J. "Perceptual Differentiation and Two Dimensions of Schizophrenia." *Journal of Nervous and Mental Disease* 129: 435-41; November 1959.
- ZUCKERMAN, MARVIN; OLTEAN, MARY; and MONASHKIN, IRWIN. "The Parental Attitudes of Mothers of Schizophrenics." *Journal of Consulting Psychology* 22: 307-10; August 1958.

Additional References

- BECKER, WESLEY C., and OTHERS. "Factors in Parental Behavior and Personality as Related to Problem Behavior in Children." *Journal of Consulting Psychology* 23: 107-18; April 1959.
- BLOCK, JEANNE, and OTHERS. "A Study of the Parents of Schizophrenic and Neurotic Children." *Psychiatry* 21: 387-97; November 1958.
- BOSSARD, JAMES H. S., and BOLL, ELEANOR STOKER. "Adjustment of Siblings in Large Families." *American Journal of Psychiatry* 112: 889-92; May 1956.
- BRODY, SYLVIA. "Signs of Disturbance in the First Year of Life." *American Journal of Orthopsychiatry* 28: 363-67; April 1958.
- CATTELL, RAYMOND B., and COAN, RICHARD W. "Personality Factors in Middle Childhood as Revealed in Parents' Ratings." *Child Development* 28: 439-58; December 1957.
- CATTELL, RAYMOND B.; COAN, RICHARD W.; and BELOFF, HALLA. "A Re-Examination of Personality Structure in Late Childhood, and Development of the High School Personality Questionnaire." *Journal of Experimental Education* 27: 73-88; December 1958.
- EHRENWALD, JAN. "Neurosis in the Family." *Archives of General Psychiatry* 3: 232-42; September 1960.
- FISHER, SEYMOUR, and MENDELL, DAVID. "The Communication of Neurotic Patterns over Two and Three Generations." *Psychiatry* 19: 41-46; February 1956.
- FRIEDMAN, HOWARD. "A Comparison of Action Patterns of Schizophrenic and Normal Adults." *Journal of Clinical Psychology* 14: 142-46; April 1958.

- GRAY, SUSAN W. "Perceived Similarity to Parents and Adjustment." *Child Development* 30: 91-107; March 1959.
- GREENFIELD, NORMAN S. "The Relationship Between Recalled Forms of Childhood Discipline and Psychopathology." *Journal of Consulting Psychology* 23: 139-42; April 1959.
- KAUFMAN, IRVING, and OTHERS. "Parents of Schizophrenic Children: Workshop, 1959: 3. Four Types of Defense in Mothers and Fathers of Schizophrenic Children." *American Journal of Orthopsychiatry* 29: 460-72; July 1958.
- LANG, PETER J., and LUOTO, KENNETH. "Mediation and Associative Facilitation in Neurotic, Psychotic, and Normal Subjects." *Journal of Abnormal and Social Psychology* 64: 113-20; February 1962.
- MCREYNOLDS, PAUL, and COLLINS, BEVERLY. "Concept Forming Behavior in Schizophrenic and Non-Schizophrenic Subjects." *Journal of Psychology* 52: 369-78; October 1961.
- MYERS, JEROME K., and ROBERTS, BERTRAM H. *Family and Class Dynamics in Mental Illness*. New York: John Wiley & Sons, 1959. 295 pp.
- NAKAMURA, CHARLES Y. "The Relationship Between Children's Expressions of Hostility and Methods of Discipline Exercised by Dominant Overprotective Parents." *Child Development* 30: 109-17; March 1959.
- O'NEAL, PATRICIA, and ROBINS, LEE N. "The Relation of Childhood Behavior Problems to Adult Psychiatric Status: A 30-Year Follow-Up Study of 150 Subjects." *American Journal of Psychiatry* 114: 961-69; May 1958.
- PETERSON, DONALD R., and OTHERS. "Child Behavior Problems and Parental Attitudes." *Child Development* 32: 151-62; March 1961.
- ROSENBAUM, C. PETER. "Patient-Family Similarities in Schizophrenia." *Archives of General Psychiatry* 5: 120-26; August 1961.
- ROSENTHAL, DAVID. "Some Factors Associated with Concordance and Discordance with Respect to Schizophrenia in Monozygotic Twins." *Journal of Nervous and Mental Disease* 129: 1-10; July 1959.
- ROUMAN, JACK. "School Children's Problems as Related to Parental Factors." *Journal of Educational Research* 50: 105-12; October 1956.
- SCHOFIELD, WILLIAM, and BALIAN, LUCY. "A Comparative Study of the Personal Histories of Schizophrenic and Nonpsychiatric Patients." *Journal of Abnormal and Social Psychology* 59: 216-25; September 1959.
- STOTLAND, EZRA, and COTTRELL, NICKOLAS B. "Similarity of Performance as Influenced by Interaction, Self-Esteem, and Birth Order." *Journal of Abnormal and Social Psychology* 64: 183-91; March 1962.
- VOGEL, EZRA F. "The Marital Relationship of Parents of Emotionally Disturbed Children: Polarization and Isolation." *Psychiatry* 23: 1-12; February 1960.
- WATSON, GOODWIN. "Some Personality Differences in Children Related to Strict or Permissive Parental Discipline." *Journal of Psychology* 44: 227-49; July 1957.
- WECKOWICZ, T. E., and HALL, R. "Distance Constancy in Schizophrenic and Non-Schizophrenic Mental Patients." *Journal of Clinical Psychology* 16: 272-76; July 1960.

CHAPTER IV

School and Community Mental Health Programs

RICHARD L. CUTLER, PHILLIP E. SPIETH, and MARY F. WILKINSON

SINCE school and community mental health programs were last reviewed, interest and activity have increased rapidly. Many new approaches have been developed, and existing programs have been broadened. Several major books, such as those written by Allinsmith and Goethals (1961) and Jahoda (1958) and those edited by Caplan (1961) and Krugman (1958), have emphasized the central role of school and community programs in mental health. The most striking development has been a major shift in the philosophy underlying school and community mental health programs. These programs were formerly considered ancillary to the mainstream of mental health activity, which was defined in terms of the treatment of the symptomatically ill. Recently, the keynotes have become primary prevention and total management of those ecological factors that produce the difficulty. This shift in emphasis was evident in the most important publication of the period, the final report of the Joint Commission on Mental Illness and Health (1961). In this publication, the concepts of primary prevention and the use of school and community workers as live agents were forcefully articulated.

Felix (1956) called for a total shift—from the treatment of the symptomatically ill to positive preventive measures—in the approach to the problem. This emphasis found its clearest statement in Jahoda (1958). Smith (1959) said that the basis of research and practice should be not psychopathology but positive definitions of mental health.

Unfortunately, systematic research has not kept pace with theoretical and program development: the number of such researchers may be counted on one's fingers. Harvard University, Harvard Medical School and Psychiatric Service (1962), published the only major bibliography, entitled *Community Mental Health and Social Psychiatry*. A review of historical trends in the field was provided by Symonds (1959).

Conceptual and Philosophical Developments

School and community are now seen as major agents of primary prevention of mental illness. Bower (1959) described the school processes involved in such efforts. Hollister (1959), who saw the classroom as a primary locus for prevention, showed how healing could occur through social interaction in group settings. He asked for (a) the creation of more

special education programs, (b) the use of mental health professionals as school consultants, (c) a wider employment of group guidance methods, and (d) an increased awareness of personality dynamics by teachers. Morse (1961) called for preservice and in-service education for teachers in order to give them practical mental health and child management skills. Miller (1958) characterized the school as the most vital public institution in the mental health effort. Caplan (1959) indicated how public health ideas have been adapted for application to primary mental health prevention. His concept of crisis intervention involves dealing with emerging problems when the organism is under stress or in a transitional period. Specific illustrations were given by Brody (1961) for early personality development, by Pavenstedt (1961) and Rose (1961) for work with mothers and their infant children, by Klein and Lindemann (1961) for intervention in individual and family crisis situations, and by Klein and Ross (1958) for the transition of school entry. Waldfogel and Gardner (1961) offered the clearest statement of the preventive intervention concept.

Much work was devoted to bridging the gap between educational practices and mental health approaches. Specific examples were provided by Krugman (1958). Talbot (1958) argued that cultural influences on learning and personality development have been neglected in both fields. Falick, Levitt, and Rubenstein (1958) noted that the nonclinically oriented educator may impede clinical service to school children. Wall (1960) cited public pressure, poor teacher selection and training, and lack of referral sources as barriers to adequate school programs in mental health. Call (1958) identified typical rationalizations used by disinterested or resistant educators. Morse (1961) deplored the professional distrust between educators and clinicians. Liss (1958) saw a common ground based on psychodynamic views of the teaching and therapeutic processes in learning. Trippe (1958) considered whether regular classrooms or special clinical programs are better for disturbed children. Biber (1961), in a very important paper, stressed that the school situation provides a unique opportunity to develop basic ego skills and attitudes in children.

Allinsmith and Goethals (1961) surveyed the role of schools in the mental health effort and looked forward to a more active and responsible role for them. Gildea (1959) examined conceptual and practical problems in community mental health work and emphasized the primary preventive role of communities.

Programs and Techniques

During the past six years, professional mental health workers have been used increasingly as consultants to schools and communities. McNeil (1961) outlined the variety of services, including direct work with teachers

on child management, performed by consultants in the Michigan program. Bindman (1959) distinguished the function of the consultant from that of the educator, therapist, and administrator. The use of the consultant in training teachers in mental health principles was described by Hertzman (1959). How the psychiatrist functions as consultant was reported by Berlin (1956). Pearson (1958) stated that the most effective help that psychiatrists can give teachers is aid in the establishment of a mental hygiene consultation unit.

Buchmueller (1958) showed how a populous county developed a unique program in which the health department served the schools under a contractual arrangement. Ackerly and others (1958) described the function of the child clinic in work with schools; and Lytton, Knobel, and Mac-Neven (1960) reported upon the function of a psychiatric diagnostic unit in a school system. Lawrence, Spanier, and Dubowy (1962) discussed the initiation of school and community mental health services. Special programs for emotionally disturbed children were described by Rubin and Simson (1960). These several writers stressed the importance of continuing support and consultation for the teacher from the entire mental health team.

Special techniques that may be applied to children in the school setting by mental health professionals and by teachers have received increasing attention. Schiffer (1958) described a five-year program in which teachers conducted a series of "play therapy" sessions with children and reported good success. A class in human relations, conducted by teachers and supervised by school mental health personnel, was reported by Hertzman and Mueller (1958) as a promising device. Stark and Bentzen (1958) showed how small informal groups could be used to integrate the disturbed child into the normal school setting. Buckley (1958) reported an experiment indicating how analytic group-discussion methods improved teacher attitudes and techniques. Spencer (1958) showed how problems of learning and adjustment of college-age students often parallel those found in the earlier years.

Redl (1959) described the use of the life-space interview as a means of behavior management and personality change that could be applied with relative ease in schools. Newman (1961) stressed the importance of insuring that behavior-relevant messages to the disturbed child were clear and based on the manifest reality of the present situation. Newman (1956) also discussed special techniques for the management of the "acting out" boy in school. Jacobson and Faegre (1959) indicated the need for the selection of materials and procedures which would neutralize tendencies toward easy arousal. Cutts and Moseley (1957), D'Evelyn (1957), and Dreikurs (1960) offered a series of practical suggestions for dealing with classroom behavior problems. Rivlin (1958) showed how discipline, mental health, and the learning process were closely related in the school setting. Yoshino (1959) emphasized the need for improved mental health attitudes among teachers dealing with predelinquent children.

Utilization of Teachers and Other Professional Persons

Albee (1959) discussed manpower shortages in the basic mental health professions. The need to enlist other major sources of personnel was apparent. The use of teachers in a variety of mental health roles has been suggested: Phillips (1957) recommended their use as adjunctive therapists; Freer (1962), as counselors; and Gordon (1956), as guidance workers.

Abramovitz and Burnham (1959) and Henry (1957) described how the mental health of school personnel and the dynamics of school organization affect classroom learning and adjustment. The way in which teacher education programs influence mental health attitudes and practices was examined by Bernard (1958) and Biber (1958). The differences between the diagnostic orientation of the educator and of the clinician were discussed by Neubauer and Beller (1958).

The role and function of the professional psychologist have also received considerable attention. Although some emphasis was given to his consultant role by McNeil (1961), considerable concern was expressed for defining his total function relative to schools. Gottsegen and Gottsegen (1960), White and Harris (1961), and Dreikurs (1957) have published major books about school psychology. The role of the psychologist in school-relevant research was discussed by Seashore (1958). The ameliorative function of the school psychologist in certain school management problems was illustrated by Vosk (1959).

Research and Evaluation

As indicated earlier, the number of systematic research studies in the area of evaluation of school and community health programs has remained very low. However, several important surveys have appeared, among them a study by Garfield (1960) of needs for mental health research as seen by state mental health psychologists. Robinson, De Marche, and Wagle (1960) surveyed existing community efforts and resources and emphasized the inadequacy of present arrangements. A systematic and well-designed study of the project on community mental health was presented by Gildea and others (1958). Glidewell and others (1957) offered a design for the conduct of community mental health research which purportedly would separate program effects from other simultaneously operating community forces. On the basis of research findings of an extensive investigation, Cutler (1961) concluded that teacher attitudes toward themselves, toward their levels of competence, and toward their jobs, as well as their styles of dealing with children and their perceptions of children's problems, were all improved as a result of a comprehensive consultation program. Brandt and Perkins (1958) also indicated that an in-service child study

program increased the teacher's abilities to deal objectively with child behavior and interpersonal relationships.

Muuss (1960) showed the positive effects of the application of the Ojemann causal-learning program. Ojemann (1961) described the Iowa Human Relations Program, upon which the Muuss study was based.

Levin, Hilton, and Leiderman (1957) discussed the Harvard Teacher Education Research Project. The authors reported eight studies indicating the relationship between teacher personality and student productivity, between precareer measures of teacher personality and later teaching success, and between ego involvement, or teacher interest, and withdrawal from teaching. Several promising studies were reported in preliminary form in this article.

Newman (1959) showed that a special-milieu treatment program within the school setting significantly reduced maladaptive behavior among hyperaggressive boys. Phillips and Norris (1959) showed similar results from special classes after they used social and educational structures as a means of behavior control and reality reinforcement. However, a survey by Brim (1961) posed doubts of the effectiveness of programs of mass education for mental health, counseling, and group discussion.

Bibliography

- ABRAMOVITZ, A. B., and BURNHAM, ELAINE. "Exploring Potentials for Mental Health in the Classroom." *Mental Hygiene* 43: 253-59; April 1959.
- ACKERLY, S. SPAFFORD, and OTHERS. "Extension of a Child Guidance Clinic's Services to the Schools." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 204-12.
- ALBEE, GEORGE W. *Mental Health Manpower Trends*. New York: Basic Books, 1959. 361 pp.
- ALLINSMITH, WESLEY, and GOETHALS, GEORGE W. *The Role of Schools in Mental Health*. New York: Basic Books, 1961. 337 pp.
- BERLIN, I. N. "Some Learning Experiences as Psychiatric Consultant in the Schools." *Mental Hygiene* 40: 215-36; April 1956.
- BERNARD, VIOLA W. "Teacher Education in Mental Health—From the Point of View of the Psychiatrist." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 184-203.
- BIBER, BARBARA. "Teacher Education in Mental Health—From the Point of View of the Educator." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 169-83.
- BIBER, BARBARA. "Integration of Mental Health Principles in the School Setting." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 15, pp. 323-52.
- BINDMAN, ARTHUR J. "Mental Health Consultations: Theory and Practice." *Journal of Consulting Psychology* 23: 473-82; December 1959.
- BOWER, ELI M. "The Emotionally Handicapped Child and the School." *Exceptional Children* 26: 6-11; September 1959.
- BRANDT, RICHARD M., and PERKINS, HUGH V. "Teachers Change as They Study Children." *Childhood Education* 34: 218-20; January 1958.
- BRIM, ORVILLE G., JR. "Methods of Educating Parents and Their Evaluation." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 6, pp. 122-41.

- BRODY, SYLVIA. "Preventive Intervention in Current Problems of Early Childhood." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 8, pp. 168-91.
- BUCHMUELLER, A. D. "A Health Department-School District Mental Health Program." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 141-48.
- BUCKLEY, FRANK M. "Use of the Analytic Group Discussion Method with Teachers." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 213-21.
- CALL, JUSTIN D. "Preventive Mental Health in Schools." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 159-65.
- CAPLAN, GERALD. *Concepts of Mental Health and Consultation*. U.S. Department of Health, Education, and Welfare, Social Security Administration, Children's Bureau, Publication No. 373. Washington, D.C.: Government Printing Office, 1959. 269 pp.
- CAPLAN, GERALD, editor. *Prevention of Mental Disorders in Children*. New York: Basic Books, 1961. 425 pp.
- CUTLER, RICHARD L. "Research Evaluation of a School Mental Health Program." *American Journal of Orthopsychiatry* 31: 339-46; April 1961.
- CUTTS, NORMA E., and MOSELEY, N. *Teaching the Disorderly Pupil*. New York: Longmans, Green & Co., 1957. 170 pp.
- D'EVELYN, KATHERINE. *Meeting Children's Emotional Needs: A Guide for Teachers*. Englewood Cliffs, N.J.: Prentice-Hall, 1957. 176 pp.
- DREIKURS, RUDOLPH. *Psychology in the Classroom*. New York: Harper & Brothers, 1957. 237 pp.
- DREIKURS, RUDOLPH. "Coping with the Child's Problems in the Classroom." *Professional School Psychology*. (Edited by Monroe G. and Gloria B. Gottsegen.) New York: Grune & Stratton, 1960. Chapter 14, pp. 162-76.
- FALICK, M. L.; LEVITT, MORTON; and RUBENSTEIN, BEN O. "Diagnosis and Therapy in School Mental Hygiene Clinics." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 46-59.
- FELIX, R. H. "The Role of Psychology in the Mental Health Effort." *Psychology and Mental Health*. (Edited by Charles R. Strother.) Washington, D.C.: American Psychological Association, 1956. Chapter 2, pp. 4-20.
- FREER, JAMES J. "The Teacher as Counselor." *Education* 82: 336-38; February 1962.
- GARFIELD, SOL L. "Research Survey: State Mental Health Programs." *American Psychologist* 15: 319-20; May 1960.
- GILDEA, MARGARET C.-L. *Community Mental Health: A School Centered Program and a Group Discussion Program*. Springfield, Ill.: Charles C. Thomas, 1959. 169 pp.
- GILDEA, MARGARET C.-L., and OTHERS. "Community Mental Health Research: Findings After Three Years." *American Journal of Psychiatry* 114: 970-76; May 1958.
- GLIDEWELL, JOHN C., and OTHERS. "Methods for Community Mental Health Research." *American Journal of Orthopsychiatry* 27: 38-54; January 1957.
- GORDON, IRA J. *The Teacher as a Guidance Worker: Human Development Concepts and Their Application in the Classroom*. New York: Harper & Brothers, 1956. 350 pp.
- GOTTSEGEN, MONROE G., and GOTTSEGEN, GLORIA B., editors. *Professional School Psychology*. New York: Grune & Stratton, 1960. 292 pp.
- HARVARD UNIVERSITY, HARVARD MEDICAL SCHOOL AND PSYCHIATRIC SERVICE. *Community Mental Health and Social Psychiatry*. Cambridge, Mass.: Harvard University Press, 1962. 161 pp.
- HENRY, JULES. "Attitude Organization in Elementary School Classrooms." *American Journal of Orthopsychiatry* 27: 117-33; January 1957.
- HERTZMAN, J. "Dynamic Group Experiences for Teachers and Students in the Classroom." *International Journal of Group Psychotherapy* 9: 99-109; January 1959.
- HERTZMAN, JACK, and MUEBLER, MARGARET L. "The Adolescent in the School Group." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 225-34.
- HOLLISTER, WILLIAM G. "Current Trends in Mental Health Programming in the Classrooms." *Journal of Social Issues* 15: 50-58; January 1959.
- JACOBSON, STANLEY, and FAEGRE, CHRISTOPHER. "Neutralization: A Tool for the Teacher of Disturbed Children." *Exceptional Children* 25: 243-46; February 1959.

- JAHODA, MARIE. *Current Concepts of Positive Mental Health*. New York: Basic Books, 1958. 136 pp.
- JOINT COMMISSION ON MENTAL ILLNESS AND HEALTH. *Action for Mental Health*. New York: Basic Books, 1961. 338 pp.
- KLEIN, DONALD C., and LINDEMANN, ERICH. "Preventive Intervention in Individual and Family Crisis Situations." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 13, pp. 283-306.
- KLEIN, DONALD C., and ROSS, ANN. "Kindergarten Entry: A Study of Role Transition." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 60-69.
- KRUGMAN, MORRIS, editor. *Orthopsychiatry and the School*. New York: American Orthopsychiatric Association, 1958. 265 pp.
- LAWRENCE, MARGARET M.; SPANIER, IRENE J.; and DUBOWY, MILDRED W. "An Analysis of the Work of the School Mental Health Unit of a Community Health Board." *American Journal of Orthopsychiatry* 32: 99-108; January 1962.
- LEVIN, HARRY; HILTON, THOMAS L.; and LEIDERMAN, GLORIA F. "Studies of Teacher Behavior." *Journal of Experimental Education* 26: 81-91; September 1957.
- LISS, EDWARD. "The Ego Ideal Role in Learning." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 102-104.
- LYTTON, GEORGE J.; KNOBEL, MAURICIO; and MACNEVEN, ROBERT W. "The Function of a Psychiatric Diagnostic Unit in the School System." *American Journal of Orthopsychiatry* 30: 581-87; July 1960.
- MCNEIL, ELTON B. "The School Mental Health Program." *American Journal of Orthopsychiatry* 31: 332-38; April 1961.
- MILLER, ALAN D. "The Role of the School System in a Mental Health Program." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 135-40.
- MORSE, WILLIAM C. "The Mental Hygiene Dilemma in Public Education." *American Journal of Orthopsychiatry* 31: 324-31; April 1961.
- MUUSS, ROLF E. "The Effects of a One- and Two-Year Causal-Learning Program." *Journal of Personality* 28: 479-91; December 1960.
- NEUBAUER, PETER B., and BELLER, EMANUEL K. "Differential Contributions of the Educator and Clinician in Diagnosis." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 36-45.
- NEWMAN, RUTH G. "The Acting-Out Boy." *Exceptional Children* 22: 186-90, 204-13; February 1956.
- NEWMAN, RUTH G. "The Assessment of Progress in the Treatment of Hyperaggressive Children with Learning Disturbances Within a School Setting." *American Journal of Orthopsychiatry* 29: 633-43; July 1959.
- NEWMAN, RUTH G. "Conveying Essential Messages to the Emotionally Disturbed Child at School." *Exceptional Children* 28: 199-204; December 1961.
- OJEMANN, RALPH H. "Investigations on the Effects of Teaching an Understanding and Appreciation of Behavior Dynamics." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 17, pp. 378-97.
- PAVENSTEDT, ELEANOR. "A Study of Immature Mothers and Their Children." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 9, pp. 192-217.
- PEARSON, GERALD H. J. "The Most Effective Help a Psychiatrist Can Give to the Teacher." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 3-22.
- PHILLIPS, E. LAKIN. "The Use of the Teacher as an Adjunct Therapist in Child Guidance." *Psychiatry* 20: 407-10; November 1957.
- PHILLIPS, E. LAKIN, and NORRIS, G. HARING. "Results from Special Techniques for Teaching Emotionally Disturbed Children." *Exceptional Children* 26: 64-67; October 1959.
- REDL, FRITZ. "Strategy and Techniques of the Life-Space Interview." *American Journal of Orthopsychiatry* 29: 1-18; January 1959.
- RIVLIN, HARRY N. "Classroom Discipline and Learning." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 113-18.

- ROBINSON, REGINALD; DE MARCHE, DAVID F.; and WAGLE, MILDRED K. *Community Resources in Mental Health*. New York: Basic Books, 1960. 435 pp.
- ROSE, JOHN A. "The Prevention of Mothering Breakdown Associated with Physical Abnormalities of the Infant." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 12, pp. 265-82.
- RUBIN, ELI Z., and SIMSON, CLYDE B. "A Special Class Program for the Emotionally Disturbed Child in School: A Proposal." *American Journal of Orthopsychiatry* 30: 144-53; January 1960.
- SCHIFFER, MORTIMER. "The Therapeutic Group in the Public Elementary School." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 70-81.
- SEASHORE, HAROLD. "The School Psychologist and Research." *Exceptional Children* 25: 147-50; December 1958.
- SMITH, M. BREWSTER. "Research Strategies Toward a Conception of Positive Mental Health." *American Psychologist* 14: 673-81; November 1959.
- SPENCER, HARVEY. "Orthopsychiatry and Problems of Learning at College and University Levels." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 119-27.
- STARK, WILLIAM, and BENTZEN, FRANCES. "The Integration of the Emotionally Disturbed Child in the Normal School Setting." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 82-95.
- SYMONDS, PERCIVAL M. "Mental Health in the Classroom: Historical Perspective." *Journal of Social Issues* 15: 1-7; No. 1, 1959.
- TALBOT, MIRA. "A Bridge: Orthopsychiatry and Education." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 23-35.
- TRIPPE, M. J. "Mental Health and the Education of the Exceptional Child." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 154-58.
- VOSK, JEANNETTE. "The Clinical Psychologist in a Difficult School." *American Journal of Orthopsychiatry* 29: 157-64; January 1959.
- WALDFOGEL, SAMUEL, and GARDNER, GEORGE E. "Intervention in Crises as a Method of Primary Prevention." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 14, pp. 307-22.
- WALL, BARTHOLOMEW D. "Education's Mental Hygiene Dilemma." *Mental Hygiene* 44: 569-76; October 1960.
- WHITE, MARY ALICE, and HARRIS, MYRON W. *The School Psychologist*. New York: Harper & Brothers, 1961. 431 pp.
- YOSHINO, I. ROGER. "The Classroom Teacher and the Pre-Delinquent." *Journal of Educational Sociology* 33: 124-30; November 1959.

CHAPTER V

Mental Health and School Personnel

HERBERT ZIMILES*

IN A KEYNOTE speech to a conference on research in mental health and teacher education, Smith (1961) recommended that mental health be considered a rubric or chapter heading and suggested postponing its being regarded as a theoretical concept. The wide diversity of writings and research surveyed in this chapter serves to underline the wisdom of Smith's point of view. With the exception of a small number of important attempts to integrate aspects of teacher functioning or school experience with the currently burgeoning mental health movement, much of the work reported has as its foundation only an implicit and inarticulate framework.

Most of the studies concerned with the personality influences and characteristics of school personnel (for the most part, teachers) represent current phases of the continuous attempt to amplify and to revise aspects of modern educational theory. This work has been augmented and fortified by the dramatic change in strategy endorsed by some leaders of the mental health movement during the 1950's. In their recommendation that major effort be concentrated on the development of long-term preventive measures rather than on the more traditional search for new methods of treatment, many investigators such as Hollister (1959, 1961) have emphasized the central rôle of the school in fostering preventive mental health.

The interrelatedness of learning and personality growth and the need to integrate mental health concepts within the teaching process itself are the major themes of the articles by Biber (1958b) and Almy (1962). Ausubel (1959) discussed the relevance of psychodynamic and developmental concepts for the educator.

Three major volumes—*The Role of Schools in Mental Health*, by Allin Smith and Goethals (1962), *Orthopsychiatry and the School*, edited by Krugman (1958), and *The Teacher's Role in American Society*, edited by Stiles (1957)—illustrated the nature of the contribution that social science and psychiatry can make to education. In books written primarily for teachers in training, Bonney (1960), Kaplan (1959), Moustakas (1959a), and Rogers (1957) all emphasized the personality-social aspects of the teacher's role.

Training in Mental Health Concepts

Much of the concern for introducing mental health values and concepts into the schools has been reflected in research or in action programs

* The author would like to acknowledge the valuable assistance of Rays Wudowsky.

designed to educate in-service teachers, to enhance their knowledge of child development, and to raise their level of self-understanding. These programs employed mental health consultants in activities including didactic sessions with teachers, group discussions, the administration of psychotherapy to teachers, and the training of teachers in psychotherapy.

Peck and Prescott (1958) described the Institute for Child Study, where groups of in-service teachers discuss case records they themselves have collected. Moustakas (1959b) conducted a course in interpersonal relations with school personnel. Workshop projects in mental health for teachers have been conducted by Mathews and others (1961). Snyder and Berman (1960) and Buckley (1958) employed variations of group psychotherapy procedures with teachers. Schiffer (1960) trained teachers to be leaders of therapeutic play groups. Bower (1961) described mental health consultation facilities made available to teachers as part of an intensive program directed toward the early detection of emotional disturbance in children. Perhaps most novel was the program described by Ackerly and others (1958, 1960), wherein teachers worked full time in a child guidance clinic for six months and received some training in psychotherapy.

Many of the reports previously mentioned are of pilot projects. The evaluations by the authors of their work are sometimes based on systematic, objective study and sometimes, merely on impressions gained from the reactions of some of the participants. Even though the results of some experiences were demonstrably positive, it should be noted that the programs were usually conducted with a minority group of favorably disposed volunteer teachers. Although the need for careful, objective evaluation of such projects cannot be overemphasized, it would be unfortunate if work in this field is postponed because the highest forms of methodological rigor cannot be applied to an evaluation of effects of the research.

The aims and methods of many of these studies seem to reflect the tastes and talents of the investigators, most of whom appear to be responding to the conviction that teachers should know more about mental health than they do. The objectives seldom appear to develop from a clear and definite theoretical position regarding teaching or the nature of the learning process. Perhaps enough preliminary work has been done; if so, future studies can be more deliberately and systematically planned so that they may begin to have greater cumulative impact.

The preoccupation with increasing the awareness of mental health principles among teachers is also apparent at the level of teacher training, which probably will eventually prove to be more effective than previously. Four colleges received grants from the National Institute of Mental Health for experimentation with teacher training programs: Bank Street College of Education, San Francisco State College, University of Texas, and University of Wisconsin. The Bank Street College of Education training program for liberal arts graduates was described by Biber (1958b) and by Biber, Gilkeson, and Winsor (1959) as a three-fold operation involv-

ing lecture-discussion, psychiatrically supervised individual guidance, and direct experience with children in classrooms—experience that is integrated within a mental-health-oriented theoretical framework.

The experimental programs just cited have been concerned with ways of effecting a change in information level, in attitudes, and, ultimately, in action. Their effects may not always be salutary. How is a teacher influenced by the intensive study of psychopathology or by training in psychotherapy itself? Will such experiences tend to blur the differences between the educative role of the teacher and the curative role of the psychotherapist? Both Pearson (1958) and Neubauer and Beller (1958) believed that this distinction must be kept very clear. Will a teacher who has gained such deep insights be content to remain in the teaching profession, where the application of such knowledge can be made only indirectly? Will such intensive experiences lead to an unintended distortion in the perception of the teacher role? Will they deflect the teacher from more important responsibilities? Bernard (1958) and Biber (1958b) have maintained that an awareness of psychodynamic principles should not be grafted to the role of the teacher. Instead, it must be infused within the fiber of the teaching process and the professional self-image, within the teacher-child relationships, and within the curriculum, in order that these factors remain the central focus of the teacher in his training and later in his professional role.

Teachers' Perception of Children's Behavior

The manner in which teachers interpret children's behavior, especially in comparison with the approach of the clinicians, continues to receive sporadic study. Gildea and others (1958) reported a high level of agreement between teachers' and mental health workers' judgments of the emotional-adjustment level of children. Goertzen (1957) found that both teachers and psychologists could predict accurately the attitudes of seventh-graders toward their peer group, whereas Frymier (1960) observed that teacher trainees' estimates of how a group of high school students would respond to the F Scale were relatively inaccurate. Stouffer (1956) found that elementary school teachers' ratings correlated more highly with mental hygienists' ratings than did those of secondary school teachers. Hunter (1957) reported a closer relationship between a current group of teachers' rankings of behavior and those of mental hygienists than that found by Wickman in 1926, although the correlation was still quite low. Differences were found between the rankings of male and female teachers but not between those of married and single teachers.

In reviews of the findings of recent studies, Beilin (1959) and Beilin and Werner (1957) concluded that teachers' attitudes toward behavior tended to resemble more closely those of clinicians. One may question whether clinicians should be regarded as indisputable experts in this

sphere and whether it is even reasonable to expect teachers and clinicians to have identical frames of reference in such matters. In a curious turn-about, Stewart (1957) expressed disappointment with his findings that groups of high school teachers and counselors agreed so closely in their prescription of treatment for a series of hypothetical cases. He chided the counselors for lack of distinctiveness in their ratings and attributed this shortcoming to their backgrounds as former teachers.

Many studies continued to indicate that teachers tend to be more sensitive to and disapproving of aggressive behavior. FitzSimons (1958) found that teachers were more successful in detecting potential delinquency than in identifying potentially serious mental illness among their children.

The problem of how teachers' perceptions of behavior can be changed by the effective teaching of psychodynamic principles is a profound one. Chansky (1958) administered the *Minnesota Teacher Attitude Inventory* to a group of teacher trainees at the conclusion of a course in child development and then asked them to respond to the instrument a second time according to how they would expect their instructor to answer each item. The high correlation found between the students' own scores and those attributed to the instructor by the students suggested the marked degree to which people assimilate information regarding mental health within their own schemata. The widespread resistance to critical thinking about behavior is illustrated by the observation of Cumming and Cumming (1957). In their study of mental health education, they noted the remarkable degree to which laymen failed to notice markedly deviant—even psychotic—behavior in their day-to-day encounters. It is apparent that new and dynamic methods of instruction need to be adopted if substantial changes in attitudes toward behavior are to occur.

Bernard (1958) stressed the value of teacher trainees' working with and studying real children rather than concentrating upon hypothetical situations. Watson (1957) recommended that group psychotherapy be substituted for other types of course requirements and that academic credit be allowed for personal psychoanalysis.

Influences of Teachers' Mental Health upon Children

Teachers have been asked to offer mental health guidance as well as to receive it. Ojemann's project (1958, 1961), in which children were instructed through classroom procedures in a causal orientation to behavior, continues to generate interesting findings. Hertzman (1956) reported on a program for teaching human relations to high school students and described criteria for selecting and training teachers for such a course. Seeley (1959) enthusiastically described some early findings of his experimentation with free-discussion classes for children.

In addition to studies involving deliberate attempts to influence children's attitudes and behavior, considerable work has been concerned with the

relationship between teachers' and children's personality-social behavior. On the basis of a series of observations in classrooms, J. Henry (1957) speculated about the manner in which the expression of unconscious motives of the teacher results in the formation of distinctive maladaptive teacher-child patterns. Keislar and McNeil (1959) studied the differential responsiveness of teachers to reactions of pleasure and of achievement in their pupils.

N. Henry (1960) edited a collection of important papers presenting a social-psychological analysis of the classroom. Kohn (1962) was concerned with the nature of home-school interaction and with the opportunities for new and corrective experiences available to the child who is beginning school. A study attempting to assess the cumulative psychological impact of a school experience on the cognitive and personality development of nine-year-old children was reported by Biber (1961).

Psychopathology in Teachers

In a sensational exposé entitled *The Mentally Disturbed Teacher*, Shipley (1961) presented case studies of teachers, depicting various personality disturbances. However, the relationship between the symptom pictures reported and the content of the professional experiences of the individuals was not discussed. After surveying studies of maladjustment in teachers, Kaplan (1959) concluded that "three million children are daily exposed to teachers who are too maladjusted to be around children."

Ryans (1960) found no differences between the level of emotional-adjustment scores obtained by primary and secondary school teachers. Male teachers did tend to score higher on adjustment than did female teachers, especially at the secondary school level.

More relevant to the issue at hand is the manner in which emotional conflict may affect teaching behavior. Bernard (1958) cautioned against excluding from the teaching profession all those who show signs of maladjustment and suggested that a teacher's neurosis may serve as an asset in his professional role through such manifestations as greater sensitivity to the needs of children and more intense motivation. In a report on school phobia in five neurotic teachers, Monsour (1961) noted that all five teachers were highly regarded by their principals. Ryans (1960) found no significant correlations between teacher adjustment scores and criterion measures.

Teacher Characteristics

In his *Characteristics of Teachers*, Ryans (1960) reported on a research project of great scope and rigor. After obtaining measures of teacher behavior, he employed a somewhat novel research strategem in developing

paper-and-pencil correlates of these measures, which subsequently formed the bases for comparisons of characteristics among various groups of teachers. His volume is a veritable handbook of selected aspects of psychometric methods. Ryans has provided an impressive demonstration of the nature of the contribution which objective testing and psychometric methods can make to the study of teacher personality.

Enough studies of teacher personality have been conducted for a critical reaction to take place. Gowan (1960) suggested that more attention be given to the measure of the criterion. Tyler (1960) questioned the usefulness of the entire body of work and launched into a comprehensive criticism of almost all its facets. Getzels and Jackson (1960) asked for more thoughtful choices of assessment procedures and for the selection of predictor and criterion measures that share a common theoretical framework.

Although the writer located more than 40 other research contributions pertaining to the study of various characteristics of teachers, it was decided that they would not be cited here, since the October 1963 issue of the REVIEW will be concerned to a large extent with the content of such contributions.

Personal-Professional Factors

The nature of his professional self-image is not likely to support the teacher in his role as a positive force for mental health. Rogers (1957) and Kaplan (1959), among others, described the emotional and social pressures associated with teaching. The futility of strengthening the teacher's mental health role through supplementary training when he is fundamentally dissatisfied with or uninterested in his work is all too apparent. However, studies by Mason, Dressel, and Bain (1959) and by Haubrich (1960) indicated the high incidence of "contingent career commitment" among women teachers and "limited career commitment" in men. Thorndike and Hagen (1961) found that those men who left teaching to move into some other career scored higher on a battery of Air Force tests than did those who remained in teaching. The findings of Allinsmith and Goethals (1962) and of Johnson (1958) attested to the low esteem in which the profession of teaching is held. If teaching is shunned by the most able and held to be only marginally attractive by those who do choose the profession, how may the increasingly complex duties of the teacher be expected to be carried out successfully?

Clearly, profound changes in the structure and composition of the teaching profession must be introduced. Since any change in so ponderous an entity can be effected only with great effort and expense, research must help provide direction to the movement. If fundamental changes in recruiting are to occur, a broad, intensive study of the considerations which alienate promising persons should be undertaken. A great deal more must

be known about the factors which shape the public image of the teacher, not in terms of the superficial stereotypes usually evoked but in relation to such deep-rooted determinants as the mechanism of the displacement of resentment from the parents to the teacher.

Another area which deserves more intensive study is that of the dynamics of administrator-teacher relationships. If most male teachers view teaching as a necessary transitory activity en route to an administrative position, as suggested by Mason, Dressel, and Bain (1959), can stability and high quality of functioning be expected? Must the administrative position be so much more attractive than the job of teacher? This situation does not exist in other human-relations professions. How are children influenced by the fact that the principal is sometimes the autocratic parent of their teacher? If teachers feel minimally responsible and therefore minimally involved in their work, can they do a satisfactory job? These questions point to the need for experimentation with different school administrative structures in which responsibility and power are decentralized. A study of the manner in which the administrative structure of a school may influence varied aspects of teacher functioning was reported by Horton (1962).

Nonteaching Personnel

The rapidly increasing use of mental health personnel in the schools has stimulated a great many articles describing new resources and professional-role functions. Falick, Levitt, and Rubenstein (1958) described the functioning of a school mental hygiene clinic. Wrenn (1957) defined the role of the school counselor and placed emphasis on the need to consider the problems of the normal child.

Pearson (1958), Neubauer and Beller (1958), and Hirning (1958) wrote about the nature of the contribution a psychiatrist can make in a school setting. Lytton, Knobel, and MacNeven (1960) described the function of a psychiatric-diagnosis unit in a school system.

Two textbooks in the relatively new field of school psychology were published. Although the two overlap greatly in content, White and Harris' (1961) *The School Psychologist* may be viewed largely as a manual for the student and the young practitioner; whereas *Professional School Psychology*, edited by Gottsegen and Gottsegen (1960), is composed of a collection of papers which survey major areas of concern. The research interests and opportunities of a psychologist working in a school setting were outlined by Fiske (1957).

Considering the powerful position the principal commands in the planning and enactment of school policy, it is surprising to observe the paucity of research concerned with principals. After finding no appreciable correlation between a battery of personality tests administered to a group of principals and the frequency of their authoritarian and democratic be-

havior, Hines (1956) came to the questionable conclusion that since authoritarian and democratic tendencies are not determined by personality, they can therefore be taught. In reporting upon an instrument to assess principals' attitudes, Scott (1958) described a number of questionnaire items that were found to distinguish between those principals judged by supervisors to be most effective and those judged to be least effective.

The Question of Values

To be concerned with the role of schools in mental health is to consider the school as an agent for social change. Inevitably, questions are raised concerning the value structure underlying the advocacy of change. What is the nature of the social changes proposed? What criteria are to be used to determine the desirability of the changes? How are they to be effected? The slow pace of social change, induced by social scientists and educators, together with the amorphous, generally benign quality of the values underlying the mental health education movement have so far not provoked much inquiry. Careful study of the relation of school to social change will come as soon as social scientists can speak articulately and can manipulate efficiently the variables they study. Helfant (1956) reported one instance of community opposition to phases of a preventive mental health program in schools. As more daring and radical suggestions are put forth, the value issue will become a compelling one. Biber's (1958a) discussion of the role of values in teacher-evaluation research procedures and Smith's (1961) approach to the question of values in mental health are signs that this issue is beginning to be met.

Bibliography

- ACKERLY, S. SPAFFORD, and OTHERS. "Extension of a Child Guidance Clinic's Services to the Schools." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 204-12.
- ACKERLY, S. SPAFFORD, and OTHERS. "Fostering Mental Health in the Classroom." *Journal of Teacher Education* 11: 365-69; September 1960.
- ALLINSMITH, WESLEY, and GOETHALS, GEORGE W. *The Role of Schools in Mental Health*. New York: Basic Books, 1962. 337 pp.
- ALMY, MILLIE C. "Intellectual Mastery and Mental Health." *Teachers College Record* 63: 468-78; March 1962.
- AUSUBEL, DAVID P. "Viewpoints from Related Disciplines: Human Growth and Development." *Teachers College Record* 60: 245-54; February 1959.
- BEILIN, HARRY. "Teachers' and Clinicians' Attitudes Toward the Behavior Problems of Children: A Reappraisal." *Child Development* 30: 9-25; March 1959.
- BEILIN, HARRY, and WERNER, EMMY. "Sex Differences Among Teachers in the Use of the Criteria of Adjustment." *Journal of Educational Psychology* 48: 426-36; November 1957.
- BERNARD, VIOLA W. "Teacher Education in Mental Health—From the Point of View of the Psychiatrist." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 184-203.
- BIBER, BARBARA. "Problems of Values and Measures in Evaluation of Teaching." *Educational Leadership* 15: 213-17; January 1958. (a)

- BIBER, BARBARA. "Teacher Education in Mental Health—From the Point of View of the Educator." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 169-83. (b)
- BIBER, BARBARA. "Integration of Mental Health Principles in the School Setting." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 15, pp. 323-52.
- BIBER, BARBARA; GILKESON, ELIZABETH; and WINSOR, CHARLOTTE. "Basic Approaches to Mental Health: Teacher Education at Bank Street College." *Personnel and Guidance Journal* 37: 558-68; April 1959.
- BONNEY, MERL EDWIN. *Mental Health in Education*. Boston: Allyn and Bacon, 1960. 434 pp.
- BOWER, ELI M. "Primary Prevention in a School Setting." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 16, pp. 353-77.
- BUCKLEY, FRANK M. "Use of the Analytic Group Discussion Method with Teachers." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 213-24.
- CHANSKY, NORMAN M. "How Students See Their Teacher." *Mental Hygiene* 42: 118-20; January 1958.
- CUMMING, ELAINE, and CUMMING, J. H. *Closed Ranks: An Experiment in Mental Health Education*. Cambridge, Mass.: Harvard University Press, 1957. 192 pp.
- FALICK, M. L.; LEVITT, MORTON; and RUBENSTEIN, BEN O. "Diagnosis and Therapy in School Mental Hygiene Clinics." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 46-59.
- FISKE, DONALD W. "Psychology and the Educative Process." *School Review* 65: 317-29; Autumn 1957.
- FITZSIMONS, MARIAN J. "The Predictive Value of Teachers' Referrals." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 149-53.
- FRYMIER, JACK R. "Prospective Teachers' Estimates of Adolescents' Responses to F Scale Items." *Journal of Experimental Education* 29: 183-88; December 1960.
- GETZELS, JACOB WARREN, and JACKSON, P. W. "Research on the Variable Teacher: Some Comments." *School Review* 68: 450-62; Winter 1960.
- GILDEA, MARGARET C.-L., and OTHERS. "Community Mental Health Research: Findings After Three Years." *American Journal of Psychiatry* 114: 970-76; May 1958.
- GOERTZEN, STANLEY M. "A Study of Teachers' and Psychologists' Ability To Predict Seventh Graders' Opinions of Certain Behaviors of Their Peer Group." *Journal of Educational Psychology* 48: 166-70; March 1957.
- GOTTSEGEN, MONROE G., and GOTTSEGEN, GLORIA B., editors. *Professional School Psychology*. New York: Grune & Stratton, 1960. 292 pp.
- GOWAN, JOHN C. "Self-Report Tests in the Prediction of Teaching Effectiveness." *School Review* 68: 409-19; Winter 1960.
- HAUBRICH, VERNON F. "The Motives of Prospective Teachers." *Journal of Teacher Education* 11: 381-86; September 1960.
- HELFANT, KENNETH. "A School Project in Preventive Mental Hygiene." *Educational Leadership* 14: 102-10; November 1956.
- HENRY, JULES. "Attitude Organization in Elementary School Classrooms." *American Journal of Orthopsychiatry* 27: 117-33; January 1957.
- HENRY, NELSON, editor. *The Dynamics of Instructional Groups*. Fifty-Ninth Yearbook, National Society for the Study of Education. Chicago: University of Chicago Press, 1960. 286 pp.
- HERTZMAN, JACK. "Human Relations in the Classroom." *American Journal of Orthopsychiatry* 26: 635-42; July 1956.
- HINES, VYNCE A. "F Scale, GAMIN, and Public School Principal Behavior." *Journal of Educational Psychology* 47: 321-28; October 1956.
- HIRNING, L. CLOVIS. "Functions of a School Psychiatrist." *Teachers College Record* 59: 211-24; January 1958.
- HOLLISTER, WILLIAM G. "Current Trends in Mental Health Programming in the Classroom." *Journal of Social Issues* 15: 50-58; January 1959.
- HOLLISTER, WILLIAM G. "Strengthen the Mental Health Impact of Our Schools." *Journal of Health, Physical Education, and Recreation* 32: 25-27; March 1961.

- HORTON, DONALD. "Educational Goals and the Social System of the School." *National Elementary Principal* 41: 43-48; February 1962.
- HUNTER, ELMWOOD C. "Changes in Teachers' Attitudes Toward Children's Behavior over the Last Thirty Years." *Mental Hygiene* 41: 3-11; January 1957.
- JOHNSON, ALFRED HAROLD. "The Responses of High School Seniors to a Set of Structured Situations Concerning Teaching as a Career." *Journal of Experimental Education* 26: 263-314; June 1958.
- KAPLAN, LOUIS. *Mental Health and Human Relations in Education*. New York: Harper & Brothers, 1959. 476 pp.
- KEISLAR, EVAN R., and MCNEIL, JOHN D. "The Use of Pupil Accomplices To Investigate Teacher Behavior." *Journal of Experimental Education* 27: 237-40; March 1959.
- KOHN, MARTIN. "The Importance of the Beginning: Kindergarten." *National Elementary Principal* 41: 18-22; April 1962.
- KRUGMAN, MORRIS, editor. *Orthopsychiatry and the School*. New York: American Orthopsychiatric Association, 1958. 265 pp.
- LYTTON, GEORGE J.; KNOBEL, MAURICIO; and MACNEVEN, ROBERT W. "The Function of a Psychiatric Diagnostic Unit in the School System." *American Journal of Orthopsychiatry* 30: 581-87; July 1960.
- MASON, WARD S.; DRESSEL, ROBERT J.; and BAIN, ROBERT K. "Sex Role and the Career Orientations of Beginning Teachers." *Harvard Educational Review* 29: 370-83; Fall 1959.
- MATHEWS, W. MASON, and OTHERS. "A Research Evaluation of an Action Approach to School Mental Health." *American Journal of Orthopsychiatry* 31: 320-46; April 1961.
- MONSOUR, KAREM J. "School Phobia in Teachers." *American Journal of Orthopsychiatry* 31: 347-54; April 1961.
- MOUSTAKAS, CLARK E. *The Alive and Growing Teacher*. New York: Philosophical Library, 1959. 157 pp. (a)
- MOUSTAKAS, CLARK E. "Basic Approaches to Mental Health: A Human Relations Seminar at the Merrill-Palmer School." *Personnel and Guidance Journal* 37: 342-49; January 1959. (b)
- NEUBAUER, PETER B., and BELLER, EMANUEL K. "Differential Contributions of the Educator and Clinician in Diagnosis." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 36-45.
- OJEMANN, RALPH H. "Basic Approaches to Mental Health: The Human Relations Program at the State University of Iowa." *Personnel and Guidance Journal* 37: 198-206; November 1958.
- OJEMANN, RALPH H. "Investigations on the Effects of Teaching an Understanding and Appreciation of Behavior Dynamics." *Prevention of Mental Disorders in Children*. (Edited by Gerald Caplan.) New York: Basic Books, 1961. Chapter 17, pp. 378-97.
- PEARSON, GERALD H. J. "The Most Effective Help a Psychiatrist Can Give to the Teacher." *Orthopsychiatry and the School*. (Edited by Morris Krugman.) New York: American Orthopsychiatric Association, 1958. pp. 3-22.
- PECK, BERNARD, and PRESCOTT, DANIEL A. "Basic Approaches to Mental Health: The Program at the Institute for Child Study, the University of Maryland." *Personnel and Guidance Journal* 37: 115-26; October 1958.
- ROGERS, DOROTHY. *Mental Hygiene in Elementary Education*. Boston: Houghton Mifflin Co., 1957. 497 pp.
- RYANS, DAVID G. *Characteristics of Teachers*. Washington, D.C.: American Council on Education, 1960. 416 pp.
- SCHIFFER, MORTIMER. "The Use of the Seminar in Training Teachers and Counselors as Leaders of Therapeutic Play Groups for Maladjusted Children." *American Journal of Orthopsychiatry* 30: 154-65; January 1960.
- SCOTT, FRANK A. "The Development and Evaluation of an Instrument To Assess the Attitudes of Public School Principals." *Journal of Experimental Education* 26: 185-96; March 1958.
- SEELEY, JOHN R. "Basic Approaches to Mental Health: The Forest Hill Village 'Human Relations Classes.'" *Personnel and Guidance Journal* 37: 424-34; February 1959.

- SHIPLEY, JOSEPH T. *The Mentally Disturbed Teacher*. Philadelphia: Chilton Co., 1961. 397 pp.
- SMITH, M. BREWSTER. "Mental Health' Reconsidered: A Special Case of the Problem of Values in Psychology." *American Psychologist* 16: 299-306; June 1961.
- SNYDER, BENSON R., and BERMAN, LEO. "The Use of a Psychoanalytic Group Approach with Teachers at a Junior High School." *American Journal of Orthopsychiatry* 30: 767-79; October 1960.
- STEWART, LAWRENCE H. "Teachers and Counselors Look at Students: Some Implications for Guidance Practice." *Personnel and Guidance Journal* 35: 565-68; May 1957.
- STILES, LINDLEY J., editor. *The Teacher's Role in American Society*. New York: Harper & Brothers, 1957. 298 pp.
- STOUFFER, GEORGE A. W., JR. "The Attitudes of Secondary School Teachers Toward Certain Behavior Problems of Children." *School Review* 64: 358-62; November 1956.
- THORNDIKE, ROBERT L., and HAGEN, ELIZABETH. "Men Teachers and Ex-Teachers: Some Attitudes and Traits." *Teachers College Record* 62: 306-16; January 1961.
- TYLER, FRED T. "Teachers' Personalities and Teaching Competencies." *School Review* 68: 429-49; Winter 1960.
- WATSON, GOODWIN. "Psychoanalysis and the Future of Education." *Teachers College Record* 58: 241-47; February 1957.
- WHITE, MARY ALICE, and HARRIS, MYRON W. *The School Psychologist*. New York: Harper & Brothers, 1961. 431 pp.
- WRENN, C. GILBERT. "Status and Role of the School Counselor." *Personnel and Guidance Journal* 36: 175-83; November 1957.

CHAPTER VI

Health Education

EDWARD B. JOHNS

RESearch in health education during the past six years moved ahead significantly in both breadth and depth of investigation. Studies ranged from philosophical and historical to evaluative aspects of health education. Considerable variety was apparent in the research methodology that extended from the normative-survey type to the experimental type. The research reviewed in this chapter indicates that many studies were designed toward basic research. For example, several studies appraised the effectiveness of programs designed to change the health behavior of children, youth, and adults.

Professional associations promoting health education increased their activities during the period under review. The Research Council of the American Association for Health, Physical Education, and Recreation published a number of important studies in its *Research Quarterly*. The American Public Health Association, School Health Section, Committee on Research (1960), reported 48 areas of needed research and presented basic resources for the reporting of research. Irwin (1961) also identified areas in which research is needed.

Bronfman School Health Education Study

The most significant breakthrough in health education research occurred in 1961 when the Bronfman School Health Education Study was established. It is located at the National Education Association Headquarters in Washington, D.C. This two-year investigation is financed by two substantial grants from the Samuel Bronfman Foundation of New York City and is being conducted in cooperation with the American Association for Health, Physical Education, and Recreation. Sliepcevich, who is directing the project, reported that the major purpose is to improve the teaching of health education in the public schools of the United States (*Journal of Health, Physical Education, and Recreation*, 1962). The first phase of the Study assessed the current status of school health education in a stratified random sample of 135 large, medium, and small school districts throughout the country. The second phase consisted of exploratory testing of sample classes of students in grades 6, 9, and 12 in the participating school districts. Of the school districts invited to participate, 94 percent agreed; 38 of the 50 states were involved. The health education tests used included Yellen's (1962) for grade 6, Colebank's (1962) for grade 9, and Le Maistre and Pollock's (1962) for grade 12. Of the school

districts involved, 91.2 percent returned the test data. Results of the experimental testing phase were not available at the end of the first year of the Study.

Sliepceвич described a third phase of the Study, which emanated from a synthesis of research prepared by a selected group of 16 health educators. This synthesis was related to (a) health needs and problems, (b) health interests, (c) health and safety misconceptions, (d) health knowledge, (e) health attitudes, (f) testing of behavior, (g) textbook accuracy and readability, (h) methods and patterns of health instruction, (i) motivational factors, (j) gradation of health concepts, (k) state surveys of health education, and (l) historical development of health instruction. The aim of the Study is to utilize the findings from the three phases as a basis both for further research and for development of a plan of action to improve the quality of health instruction in the schools.

Philosophical and Historical Studies

A step forward has been taken in filling the gap in philosophical and historical research in health education. Oberteuffer (1962), using the expert consultative services of a prominent philosopher, prepared a report of the careful studies made by the American Association for Health, Physical Education, and Recreation, Commission on Philosophy. The report is titled "A Point of View for School Health Education." This philosophical statement is a synthesis of a series of beliefs about the "nature of health, education, the educational process, schools, people, and society." The statement was also constructed to serve as (a) a guide and stabilizing force, (b) a direction pointer for action in program development, and (c) a philosophy of and for health education. The Commission viewed health education as both process and program which contribute to the improvement of individual and community health by promoting changes in "individual development, attitudes, and behavior."

Hoyman (1962) developed a provocative modern concept of health that contributes to an understanding of health education. He defined health, in terms of a dynamic process, as "optimal personal fitness for full, fruitful, creative living." His concept was built upon and depicted as a health triangle composed of physical fitness, mental health, and human ecologic interaction. He presented the three determinants of health as heredity, environment, and spiritual faith. Hoyman also made a plea for the development of specific, objective health indicators that would provide a health index for an individual or for a population group.

The void in the body of literature reporting historical developments in health education has been partially filled by two important publications. Means (1962) prepared *A History of Health Education in the United States*. This publication has proved to be an accurate and comprehensive

account of the evolution of health education since 1787. Examination revealed that most of the data were obtained from original and firsthand sources. Considerable data, otherwise unobtainable, were produced through the currently accepted research method of oral history gathered from pioneers still living. While previous historical studies purport that school health education stemmed from such fields as physiology, anatomy, public health, education, or physical education, Means presented its evolvement as a separate and distinct discipline. Childs (1961) traced the history of school health education in New York State from the colonial period to 1960. This historical account, which was based on changes in laws and practices, pointed out trends in health instruction, health services, and school environment. Also considered in the account was the influence of individuals and associations in the growth and development of health education programs.

Health Education Trends

Beyrer (1960) studied analytically 104 trends in school and college health education. Her results set forth the specific trends about which three groups of educators differed, and the trends with highest and lowest rankings were identified. Those with the highest rankings were considered of utmost value and significance as guidelines to strengthen present progress and to direct future school and college health education. The highest trend was the "increasing recognition that the emotional health of the teacher influences the emotional tone of the classroom."

Health Education Needs and Interests

Since health education needs and interests provide basic criteria for instructional programs, further investigation in these areas is useful for improving health teaching and curricular planning. Lantagne (1958) continued his interest studies in a special instructional area—marriage and parenthood. Four thousand high school students were given inventories. Lantagne established that (a) such interests can be measured; (b) they are of deep concern to high school students; and (c) they follow a pattern according to sex, although both sexes have some similar interests in the area. With the use of a valid and reliable instrument, he found the highest ranking interest of boys was juvenile delinquency; of girls, problems of pregnancy.

Schaller (1960) used a valid and reliable inventory comprised of 207 health concepts to determine the combined health needs and interests of selected secondary school students in Indiana. Four adaptations of the inventory were made to apply to students, parents, health teachers, and physicians. The results provided a common core of health interests among

high school students. Because the expressed needs of boys and girls were markedly different, Schaller supported the procedure for separating the sexes in health classes.

Rich (1960) identified the health education needs of high school students in a sample of 959 B10 and A12 students in eight Los Angeles schools. Four devices were used to determine needs: Le Maistre Health Behavior Inventory, *Mooney Problem Check List*, results of examinations, and students' personal health histories. After identification, the needs were classified into 13 instructional areas. Rich demonstrated that the process of determining needs was an effective means of evaluating the school health program, since both strengths and weaknesses became apparent. She noted, for example, the lack of a block of time allotted for instruction; a want of home, school, and community coordination; and an absence of team attack on adolescents' problems within the school. Willgoose (1961) reviewed the research in child growth and development related to elementary school health and education in order to pinpoint growth and development findings that were basic to curricular planning.

Knowledge, Attitude, and Practice Studies

A marked increase in the number of studies concerned with the behavioral aspects of health education was noted. Kilander (1961) summarized the results of 25 years of testing school and college health knowledge. He found a slight but steady improvement of health information in students and adults, although few were adequately informed in all areas. He also found that a college education may or may not include essential health information, better-informed students tend to have better health practices, and teachers tend not to be adequately informed about health. Many health misconceptions were revealed through Kilander's testing of health knowledge.

A series of studies concerned with misconceptions about health and safety as well as with concepts of healthful living has been conducted. Borozone and Irwin (1960) investigated harmful misconceptions among prospective elementary school teachers. The findings of these studies reveal the need for a greater emphasis to be placed on the correction of health misconceptions in teacher education programs.

Dearborn (1958) administered his standardized *Health Knowledge Test* as a pretest to 12,000 freshman and sophomore students in 15 colleges and universities in California. His results showed widespread health ignorance, both student recognized and unrecognized, particularly among junior college students. He demonstrated the need for pretesting as an aid to sound planning of health instruction. Greenslade (1960) appraised the health information in nine textbooks designed for grades 9 through 12. She found that the books could be improved by greater attention to needs and interests, more positive health information, and elimination of non-health and repeated materials.

Mayshark (1958) critically analyzed attitude measurement in health education. He reported that of the 15 scales described in the literature on the subject, only 5 seemed to be clearly attitude instruments. Aware of this lack, Richardson (1960a) constructed and validated several attitude tests and used them in subsequent investigations. His tests included the five areas of health and health education, foods and nutrition, physical fitness and exercise, sex and sex education, and physicians and medical care. Richardson's (1960b) latest instrument is a sentence completion health attitude test for college students.

The National Education Association and American Medical Association Joint Committee on Health Problems in Education (1961) has presented succinctly the recent findings pertaining to attitudinal and behavioral change with implications for health education. Attitudes that appeared necessary for particular kinds of health action were delineated, and problems relating to changing health attitudes were discussed clearly. The Committee pointed out that the health educator must consider his approach in terms of the motives and beliefs that underlie or support each attitude.

The increased evidence of the causal relationship between lung cancer and cigarette smoking has been responsible for a number of research studies concerned with smoking practices of students. Horn and others (1959) investigated the smoking attitudes and habits of 22,000 high school students in the Portland, Oregon, area. He reported 26 percent of the boys and 20 percent of the girls to be smokers during high school years. The amount smoked increased during the four school years. Data were obtained through use of an unsigned questionnaire on smoking habits. Two factors were associated with those groups in which a high proportion of smoking was found: (a) the occurrence of parental smoking and (b) the existence of personal factors characterizing inactive students who tended to be scholastically unsuccessful and to have lower academic goals. Haag and Garcia (1962) investigated the cigarette-smoking habits of girls and boys in seven public secondary schools in Austin, Texas. Their results indicated that incidence and patterns of smoking behavior were related to (a) age and sex of the pupil, (b) motivating factors for starting smoking, and (c) parental smoking habits. It also revealed the need for health education, including a unit on smoking.

Studies Related to Health Content

Research that pertains to the content of health instruction is highly pertinent to improved health teaching. A few studies are presented here as examples. Larsen (1962) reviewed research on adolescent nutrition. She found that the poorest fed member of the American family is the teenage girl. In the state of Washington, boys in the survey ate more adequately than girls; both, however, needed more milk, cheese, fruits, and vegetables. Girls also needed more whole grain cereals and eggs. Larsen stated that

although all people can learn to change, they will change only when the new action helps them achieve what they want; she cited, as an example, the teen-age girl who will accept the suggestion of adding protein foods to her diet to achieve a trim figure and more energy.

Deschin (1961) directed a significant study of teen-agers in relation to incidence of venereal disease. This study was organized because of the recent increase in venereal disease, particularly among teen-agers. In New York City, 600 teen-agers were identified as having venereal disease. Their parents were described, and the major cultural and institutional forces on both the teen-agers and their parents were noted. Personal interviews, home visits, and open-ended questions in which the teen-agers viewed themselves were some of the techniques utilized in the study. The findings were testimony for accurate information delivered with authority through the educational process. Almost all of the group had "back-fence" information about sex and venereal disease and lived by this misinformation. The need to clarify the role of sex and the standards of sexual behavior, to strengthen family ties, as well as to increase the influence of the home, the school, and the church was apparent.

Curricular Organization and Methodology

Gmur (1959) conducted an experimental study of three groups of students receiving health instruction through three different patterns of curricular organization. Gmur's findings showed a statistically significant difference in the posttest scores in favor of the group of students taking a separate, or direct, course instead of one of the two course patterns that the investigator named correlation and integration. There was no statistically significant difference in scores between the correlation and the integration groups. Evidence from this study indicated that the best results in health instruction can be achieved in the high school through direct teaching in a daily course meeting for two semesters. Witham (1960) substantiated Gmur's findings in an appraisal of health instruction in selected schools of Minnesota under three plans of scheduling. Application of analysis-of-variance techniques and a comparison of mean scores showed that direct instruction was significantly superior and indirect instruction, least effective.

Veenker and Ismail (1962) investigated and compared three different approaches to health instruction at the college level. Each of the three groups studied was taught by one of three instructional approaches: problem solving, lecture, and discussion. Scores on pretests and posttests of health knowledge, health attitudes, and health interests were analyzed by using the analysis-of-covariance technique and by making "t" tests. The results showed that all three approaches were about equally effective in the achievement of instructional outcomes.

Cauffman (1962) reported on the Columbus public schools' Health Science Television Experiment in seven junior high school classes. She found that the learning experiences through television (a) encompassed extended professional guidance services, (b) reflected a variety of teaching methods, (c) enhanced the use of school and community resources, (d) provided the personal touch, (e) helped many classes simultaneously, (f) provided scientifically accurate information representing all health content areas, and (g) gave more depth to content material in less time. She stated that educational television gave the health educator a medium through which to make his classes more dramatic and dynamic.

Teacher Education

Fikes (1957) investigated the health knowledge of prospective teachers in the field of health and physical education. He reported the need for relatively greater emphasis on health knowledge and its application. He cited, in addition, the need for increased in-service education, particularly at the elementary level. Ives (1962) studied the teacher's perceptions about experiences in health education. She compared two groups of students who had a required basic health course with another group who had both a basic health course and a professional health course. Her findings indicated that the courses given the latter group assured prospective teachers of the experience recommended. Evidence did not support the contention that health education experiences are naturally or automatically integrated in preservice courses in education.

Cushman (1960) and his professional preparation committee studied the recruitment methods, problems, enrollment, and placement of health education majors in colleges and universities offering undergraduate and graduate programs throughout the United States. Data collected indicated a slight increase in undergraduate health education majors. A significant drop occurred in the placement of these majors in public health positions, and an increase was shown in school positions accepted. Subsequently, Cushman (1961) developed a new reporting form and accurately recorded the institutions offering health education major curriculums at both the undergraduate and graduate levels, and then brought up to date the present status of professional preparation in health education.

Evaluation

Three significant and comprehensive evaluative studies were completed during this reporting period. Johns (1960) directed a five-year cooperative evaluative study with four county school districts, the University of California (Los Angeles), and the Tuberculosis and Health Association of Los Angeles County as participants. The project was financed by this

voluntary health association and the University of California research committee. The effectiveness of health education was appraised in terms of school health program activities and the pupils' knowledge of health behavior, attitudes, and practices, as well as through an analysis of the evaluative process used. Several studies were of particular value in developing new evaluative instruments to make possible appraisals which otherwise would not have been achieved. For example, the tests of Yellen (1962), Colebank (1962), and Le Maistre and Pollock (1962) were developed in conjunction with the study.

Evaluative criteria pertaining to health programs in schools were constructed for the California State Department of Education (1962a, b, c). The investigation demonstrated that administrators', teachers', and pupils' feelings about health education determine, to a large extent, what they do about their health behavior. The administration of pretests and posttests before and after instruction provided evidence of the effectiveness of instruction. Posttests showed evidence of student growth, particularly in health knowledge and attitudes. The results indicated only minor improvement in practices in short-period (six months or one year), follow-up testing. The effect of instruction on the changing of health practices can best be determined through longitudinal depth studies that follow students in their life activities over a period of years. This investigation also served as a developmental process for supervisors, teachers, and health personnel.

The Brookline (Massachusetts) School Health Study, coordinated by Young (1961), was a valuable evaluative project consisting of three phases. The first phase obtained baseline data on a wide variety of current school health practices and policies in the broad area of the school health program. These data were collected by interviews with school personnel. Strengths and weaknesses of the program were ascertained. The second phase was viewed as experimental. Two elementary schools, at extremes of the socioeconomic spectrum, were selected for the self-study experiment. Six schools between the extremes became controls. Data collected were related to the identification, discussion, and solution of school health problems. The third phase consisted of the reapplication of interview schedules and instruments of the first phase in order that changes could be studied and evaluated. The most significant accomplishment noted was the development of more frequent and effective communication as evidenced by the increased cooperation between the school authorities and the health department staff.

The Los Angeles City Schools, Division of Educational Services (1962), carried out a seven-year project concerned with extensive appraisals of the total school health program and of its phases of health service, health instruction, and healthful school living. The process of health coordination also was appraised. The strengths and weaknesses of 74 schools and colleges were assessed. An appraisal instrument for each educational level was developed and administered. A survey of alumni was undertaken to determine how effective they felt that the health instruction and health

service programs were during their school years. In general, the findings indicated that health instruction during high school had been helpful. Three-fourths of the students stated that they had received good health services.

Appraisals of healthful school living revealed that sanitary conditions were satisfactory according to established standards. The appraisals of various health service activities are valuable in clarifying duties and responsibilities of school physicians, dentists, nurses, and audiometrists. The evaluation of the effectiveness of health instruction was based on data gathered from classes at the elementary, secondary, and college levels of instruction. Information was obtained from pupils through use of instruments that were designed to determine the nature and extent of health knowledge, attitudes, practices, and problems. Additional data were derived from descriptions of pupil behavior by school personnel and parents. It was concluded that the results from a total of 41 studies provided insight into the strengths and weaknesses of the school health program.

Many of the outcomes have been used for program improvement; others have pointed the way for further development. Support of school health education could be inferred from the actions of school personnel throughout the study and from the decision of the Los Angeles City Board of Education to retain health education in the curriculum from kindergarten through grade 14. In addition, a new organizational plan for more direct teaching was adopted.

Suggested Future Research

The review of health education research cited above, particularly applicable to school health education, revealed a substantial increase in interest in research and an advancement in the kinds and quality of research. There was evidence of a broadening direction as well as a trend toward studies with greater depth. It was evident, however, that the need still exists for more basic and experimental studies, for precise research methodology, and for more interdisciplinary studies, particularly in motivational and behavioral research, as well as for additional team research among schools, colleges, and universities.

Bibliography

- AMERICAN PUBLIC HEALTH ASSOCIATION, SCHOOL HEALTH SECTION, COMMITTEE ON RESEARCH. "Research Needs in School Health." *American Journal of Public Health* 50: 1792-1806; November 1960.
- BEYRER, MARY K. "The Significance of Current Trends in School and College Health Programs." *American Journal of Public Health* 50: 1934-43; December 1960.

- BOROZONE, JOSEPH, and IRWIN, LESLIE W. "Prevalence of Certain Harmful Health Misconceptions Among Prospective Elementary School Teachers." *Research Quarterly* 31: 387-91; October 1960.
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *Criteria for Evaluating the Elementary School Health Program*. Sacramento: California State Printing Office, 1962. 20 pp. (a)
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *Criteria for Evaluating the High School Health Program*. [Junior high, four-year high, senior high.] Sacramento: California State Printing Office, 1962. 24 pp. (b)
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *Criteria for Evaluating the Junior College Health Program*. Sacramento: California State Printing Office, 1962. 15 pp. (c)
- CAUFFMAN, JOY G. "Advantages in Teaching Health Education by Television." *Journal of School Health* 32: 191-94; May 1962.
- CHILDS, HAROLD M. *A History of the School Health Education Program in New York State*. Doctor's thesis. Syracuse, N.Y.: Syracuse University, 1960. 481 pp. Abstract: *Completed Research in Health, Physical Education, and Recreation* 3: 73; No. 294, 1961.
- COLEBANK, ALBERT D. *Health Behavior Inventory*. [Junior high.] Monterey: California Test Bureau, 1962. 16 pp.
- CUSHMAN, WESLEY P. "Recruitment, Enrollment and Placement of Health Education Majors." *Journal of School Health* 30: 221-28; June 1960.
- CUSHMAN, WESLEY P. "Institutions Offering Teaching Major Curricula in Health Education at Undergraduate and Graduate Levels." *Journal of School Health* 31: 82-84; March 1961.
- DEARBORN, TERRY H. "Personal Health Knowledge of College Students Before Instruction." *Research Quarterly* 29: 154-59; May 1958.
- DESCHIN, CELIA S., director. *Teen-Agers and Venereal Diseases*. Report of American Social Health Association and New York City Health Department for the Public Health Service. Atlanta, Ga.: Venereal Disease Branch, Communicable Disease Center, U.S. Department of Health, Education, and Welfare, 1961. 168 pp.
- FIKES, JAMES A. "Health Knowledge of Teachers." *Journal of School Health* 27: 247-49; November 1957.
- GMUR, BENJAMIN C. *A Comparative Study of Health Education Outcomes Derived from Three Curricular Patterns in Secondary Schools*. Doctor's thesis. Los Angeles: University of California, 1959. 126 pp. Abstract: *Completed Research in Health, Physical Education, and Recreation* 3: 29-30; No. 3, 1961.
- GREENSLADE, MARGARET. *The Type and Amount of Health Information in Selected Health Textbooks for Grades Nine Through Twelve*. Doctor's thesis. Bloomington: University of Indiana, 1960. 1303 pp. Abstract: *Completed Research in Health, Physical Education, and Recreation* 3: 44; No. 95, 1961.
- HAAG, JESSIE H., and GARCIA, NELDA. "Smoking Habits of Secondary School Pupils." *Health Education Journal* 25: 9-10, 17; May 1962.
- HORN, DANIEL, and OTHERS. "Cigarette Smoking Among High School Students." *American Journal of Public Health* 49: 1497-1511; November 1959.
- HOYMAN, HOWARD S. "Our Modern Concept of Health." *Journal of School Health* 32: 253-64; September 1962.
- IRWIN, LESLIE W. "Some Areas of Needed Research Related to Health Teaching in Secondary Schools." *Journal of School Health* 31: 91-97; March 1961.
- IVES, CHARLOTTE Y. "Perceptions of Prospective Elementary Teachers Regarding Their Preparation in Health Education." *Journal of School Health* 32: 235-41; June 1962.
- JOHNS, EDWARD B., director. *School Health Education Evaluative Study: Los Angeles Area; 1954-1959*. Los Angeles: University of California, 1960. 128 pp.
- JOURNAL OF HEALTH, PHYSICAL EDUCATION, AND RECREATION. "School Health Education Study." *Journal of Health, Physical Education, and Recreation* 33: 28-29; January 1962.
- KILANDER, H. FREDERICK. "Health Knowledge." *Journal of Health, Physical Education, and Recreation* 32: 28-29; May-June 1961.
- LANTAGNE, JOSEPH E. "Interests of 4000 High School Pupils in Problems of Marriage and Parenthood." *Research Quarterly* 29: 407-16; December 1958.
- LARSEN, VIRGINIA L. "Research on Adolescent Nutrition." *Journal of School Health* 32: 56-62; February 1962.

- LE MAISTRE, E. HAROLD, and POLLOCK, MARION B. *Health Behavior Inventory*. [Senior high.] Monterey: California Test Bureau, 1962. 16 pp.
- LOS ANGELES CITY SCHOOLS, DIVISION OF EDUCATIONAL SERVICES. *Evaluation of the Health Program in the Los Angeles City Schools, 1954-1961*. School Publication No. 673. Los Angeles: Board of Education, 1962. 257 pp.
- MAYSHARK, CYRUS. "Critical Analysis of Attitude Measurement in Health Education, 1927-57." *Research Quarterly* 29: 309-19; October 1958.
- MEANS, RICHARD K. *A History of Health Education in the United States*. Philadelphia: Lea & Febiger, 1962. 412 pp.
- NATIONAL EDUCATION ASSOCIATION AND AMERICAN MEDICAL ASSOCIATION JOINT COMMITTEE ON HEALTH PROBLEMS IN EDUCATION. *Health Education*. Fifth edition. Washington, D.C.: National Education Association, 1961. Chapter 5, "Health Education—Attitude and Behavioral Change," pp. 95-113.
- OBERTEUFFER, DELBERT. "A Point of View for School Health Education." Report of the Commission on Philosophy for School Health Education, Division of Health Education, American Association for Health, Physical Education, and Recreation. *Journal of Health, Physical Education, and Recreation* 33: 25-27; November 1962.
- RICH, RUTH. "Health Education Needs of High School Students in a Large Diversified Metropolitan Area." *Research Quarterly* 31: 631-37; December 1960.
- RICHARDSON, CHARLES E. "A Sentence Completion Health Attitude Test for College Students." *Journal of School Health* 30: 32-35; January 1960. (a)
- RICHARDSON, CHARLES E. "Thurstone Scale for Measuring Attitudes of College Students Toward Physical Fitness and Exercise." *Research Quarterly* 31: 638-43; December 1960. (b)
- SCHALLER, WARREN E. "Health Needs and Interests as a Basis for Selecting Health Content in Secondary Schools." *Research Quarterly* 31: 512-22; October 1960.
- VEENKER, C. HAROLD, and ISMAIL, A. H. "Effectiveness of Three Approaches to College Health Instruction." *Research Quarterly* 33: 129-35; March 1962.
- WILLGOOSE, CARL E. "Research in Child Growth and Development as It Affects Elementary School Health and Education." *Journal of School Health* 31: 267-71; October 1961.
- WITHAM, JAMES H. *An Appraisal of Health Instruction in Selected Schools of Minnesota Under Three Plans of Scheduling*. Doctor's thesis. Bloomington: University of Indiana, 1960. 85 pp. Abstract: *Completed Research in Health, Physical Education, and Recreation* 3: 46; No. 106, 1961.
- YELLEN, SYLVIA. *Health Behavior Inventory*. [Grades 3, 4, 5, 6.] Monterey: California Test Bureau, 1962. 14 pp.
- YOUNG, MARJORIE A. C. "The Brookline School Health Study." *Journal of School Health* 31: 47-55; February 1961.

CHAPTER VII

Safety Education

CHARLES PETER YOST

THE SERIOUSNESS of the threat of accidents to the American people was indicated by the National Safety Council (1961). The statistics are startling. During 1960 the number of deaths from accidents totaled 93,000, and disabling injuries resulting from accidents amounted to 9,400,000. These accidents cost the nation at least \$13.6 billion. Accidents are now the principal cause of death among all persons between the ages of 1 and 36 years. According to the Metropolitan Life Insurance Company, Health and Welfare Division, School Health Bureau (1962), youths between the ages of 14 and 24 years experience more deaths from accidents than from all other causes combined. McFarland and Moore (1961) have pointed out that since accident victims, in contrast to those whose deaths are attributed to certain degenerative diseases, are in the younger age groups, there is implication of enormous cost to the productive resources of our nation in terms of life-years.

Nature of Completed Research in Safety Education

Since the 1920's, research in safety education has been disclosing facts about attitudes, teaching methods, and safety curriculums. In analyzing 386 advanced-degree studies completed during the period from 1925 to 1957, Yost (1958) found that certain areas of safety education received a great deal of attention while others were relatively untouched. Investigations pertaining to psychological aspects, home safety, and farm safety were particularly lacking in number. There were only a small number of experimental studies until 1950, when more appeared, particularly in the area of driver- and traffic-safety education.

The literature both corroborates and opposes various theories of accident causation and prevention. Stiles (1957) indicated that there is a growing awareness that accident prevention is a multicausal, complex phenomenon requiring a teamwork approach. This teamwork approach was exemplified in an outstanding publication edited by Halsey (1961), which brought together the concerted thinking of specialists in many fields of safety. The team approach in traffic safety was indicated by Neyhart (1962). Fox (1961) indicated two major points relative to accident-prevention literature: (a) it reflects inadequate research, and (b) the sources, which are widespread, are difficult to obtain.

Research in safety education consistently reveals that personal factors contribute heavily to accident causation. Heath (1957) found that meas-

urements of impulsive, sociable, and reflective traits were of value in differentiating traffic offenders from nonoffenders. Stiles (1957) reported differences between emotional adjustment of accident-repeating and accident-free children.

Several studies in which summaries of surveys of research needed in safety education are presented have been reported cooperatively by New York University, Center for Safety Education, and National Safety Council, School and College Conference (1956), and by the National Education Association, National Commission on Safety Education (1956, 1957). Malfetti (1962) reported the 20 safety education topics most important for intensive study, as determined by members of the American Association for Health, Physical Education, and Recreation, Safety Education Division.

Importance of Proper Attitudes in Accident Prevention

Research studies frequently indicate the importance of attitudes in accident prevention. Brody (1959) indicated that techniques for improving attitudes were available through interpersonal or social influences in such processes as group discussion, group discussion-decision, and role playing. Sawers (1960) found that certain types of subject matter in driver education could be handled by group discussion. He also concluded that non-directive group discussions, although more time consuming, were likely to be more effective than other approaches for certain portions of driver education courses in terms of attitudes attained. However, Chaplin (1961) found no statistical evidence that group interaction functioned to produce a more effective means of attitude modification in driver education.

Mahony (1957) suggested that concentration be placed on appropriate knowledge teaching and the development of a strong single attitude favorable to safe driving, as opposed to the development of a myriad of driver attitudes. In determining safety attitudes and their relationships to accident behavior, Bergman (1959) found that adolescents did not possess either well-defined safety attitudes or a large number of experiences and interests that tended to enforce safety attitudes.

Although it is difficult to measure attitudes accurately, Florio and Stafford (1962) reported that the best method is through direct observation of behavior under controlled conditions.

Safety Education in Schools

Yost (1956) noted that the development of safety education programs in schools has long been a favorite topic for study on the part of advanced-degree candidates. Kralovec (1961) reported on the safety education pro-

gram of the Philadelphia public schools, and Marshall (1961) indicated criteria for evaluating safety education programs. Nihan (1961) evaluated existing safety education laws and regulations in the public schools of the United States.

Steere (1957) has pointed out that if a school safety program is to be effective, it is necessary for one individual to have the major responsibility for its development and direction. Aaron (1960) reported that, to be most effective, a safety supervisor should not teach or hold multiple supervisory responsibilities.

School systems that study the accident experiences of pupils are in a favorable position to offer sound safety programs. Higgins (1961) indicated that in planning a safety education program, it is important that the program be tailored to the data furnished for the school from accident reports. In surveying accidents in 92 public schools in New York, Hase (1958) found that schools with asphalt or dirt under their playground apparatus reported the highest rates for all types of accidents; schools with sand under their playground apparatus indicated the lowest rates for all types of accidents.

Steere (1957) reported that most colleges and universities do not prepare reports of student accidents in forms which are conducive to a scientific approach to accident prevention. For example, Webster (1961) indicated that fire and safety authorities have had to rely on occasional newspaper items in order to obtain information regarding the nature and extent of college fires. Jacob (1959) stressed that colleges and universities do have a responsibility for the safety of students and staff as well as for the security of their physical plants.

Williams (1959) suggested 147 safety practices which should be employed by shop teachers in organizing and administering effective accident prevention programs in school shops.

Driver and Traffic Safety

The recent upsurge in the offering of driver education courses has resulted in the publication of literature designed to aid teachers in conducting research in safety education. Ojemann (1959) reported on the problem of developing methods of measuring pupil growth in driver and safety education. Abercrombie (1959) suggested ways for more productive teaching and more resultful learning through the employment of action research in driver education.

Several studies, such as that in *Safety Education* (1962b) and those by Loft (1957) and the National Education Association, National Commission on Safety Education (1957), indicate that graduates of high school driver education courses have fewer accidents and violations than do drivers with no such formal course. In developing a valid and reliable road test for licensing agencies and driver educators, McGlade (1960) found

that subjects with instruction in practice driving scored significantly better than subjects who did not have this instruction.

The status of driver education in schools was revealed in studies by Key (1960) and Henry (1961). The content of driver education courses was indicated by Blackburn (1956), who listed 210 concepts of driver education that are accurate and consistent with current practice and research.

Driving simulators have brought to driver education the latest and most versatile scientific methods of instruction. The effectiveness of simulators as research tools and as aids in presenting instruction has been supported by Gibbons (1961), the National Education Association, National Commission on Safety Education (1962), and the National Safety Council (1957).

The Allstate Insurance Company (1960) conducted a study with a sample of 20,000 high school students concerning the interrelationships of grades, cars, and jobs. A positive correlation was found between the amount of use of a car and failing grades as well as between car ownership and lack of achievement in school; jobs secured for the primary purpose of buying or maintaining a car were scholastically destructive. The important single aspect of the Allstate study was the parental laxity regarding the use of an automobile rather than the mere presence of the automobile itself.

Although an article in *Traffic Safety* (1958) has stated that seat belts have accumulated an amazing record for assuming the stress of accident crashes, Naibitt (1961) has reported that, for one reason or another, more than 95 percent of the drivers in the United States refuse to buy and use seat belts.

Safety in Athletics, Physical Education, and Recreation

Protective equipment for players of football and other contact sports is essential for safe participation. A joint report by American Association for Health, Physical Education, and Recreation and American Dental Association (1960) concluded that nearly all injuries to the teeth and mouth could be prevented by proper fitting and wearing of mouth protectors by football players during practice and games.

In studying the reported injuries that occurred among 48,056 male students who participated in 26 different physical education activities at Michigan State University, Dzenowagis (1962) found that a wide variation in injury rates existed.

The recent preference for outdoor pursuits has stimulated mass participation in such recreational activities as boating, water-skiing, and skin-diving. Although these activities are a part of America's "zest for living," they cannot be fully rewarding if the safety of participants is neglected. A publication prepared by New York University, Center for Safety Education (1961), revealed techniques that are known to be effective in providing for safety in recreational activities.

Safety in Pupil Transportation

The selection of qualified bus drivers is an essential part of the school bus safety program. Studies by Patterson (1959) and Preece (1961) indicated practices and procedures for the selection and training of school bus drivers. Carothers (1959) found that the use of student bus drivers resulted in a considerable saving in cost of pupil transportation with no loss in either safety or efficiency.

Legal Liability for Accidents

Teachers are charged with assuming a degree of responsibility for the welfare and safety of pupils. Kigan (1960) has reported that school-related injury cases are generally based on allegations that lack of supervision or instruction caused the injury, with the resultant charge of negligence. Hetzel (1960) indicated that only 13 of the 50 states have statutes authorizing or regulating the practice of school safety patrols. While school officials may legally establish patrols, provided that the patrols are for educational objectives and are wisely administered with due care and supervision, the legal responsibilities for supervising vehicular and pedestrian traffic do not rest with the school but with the state or municipality. Friedman (1961) indicated basic facts of test liability of driver education teachers.

Teacher Preparation

Progress is being made in the area of teacher preparation in safety education. Corbally (1961) indicated the nature of the basic course in general safety education offered by colleges and universities. Stack (1960) reported that more than 400 colleges are now offering courses to instruct teachers on matters of safety. Key (1960) stated, however, that high school driver education teachers met nationally recommended standards in only 15 states. Crabtree (1958) offered suggestions for institutions preparing teachers of driver education. Yost (1962) suggested the nature of curricular content and kinds of learning experiences most readily responded to by elementary school children.

Cutter (1961) reported that while there has been an increase in the number of safety education courses offered, they are unequally distributed in terms of number per institution and geographic locations of the institutions that offer them. A publication of the National Education Association, National Commission on Safety Education (1960), was designed to enhance the quality of driver education by raising the professional level of those who teach driver education. The availability of a major or minor in safety education was reported in *Safety Education* (1962a).

Safety Centers

During the past six years, a great deal of attention has been given to the establishment of safety centers at colleges and universities. Sheeche (1960), Stack (1960), and Strasser (1960) indicated the development, status, and future outlook of safety centers. Elkow (1959) indicated that financial aid for such centers would come from industry, insurance groups, direct state appropriations, or foundations.

Dissemination of Research in Safety Education

Making research information available to interested people has been one of the major problems in the field of safety education. Two series of publications by the National Safety Council (1962a, b), of which those for the current year are representative, have been instrumental in providing people with the essence of completed studies and in bridging the gap between research and practice. In the first cited publication, almost every month one or two pages are devoted to notes or short statements about research activities taking place in various locations. Comprehensive reports of research are presented quarterly (March, June, September, and December) in separately numbered volumes that are bound with four of the monthly issues of *Traffic Safety*, which themselves carry a different volume number.

Bibliography

- AARON, JAMES ETHRIDGE. *A Study of Supervisory Practices in Safety Education in Selected Cities in the United States: A Study of the Present Status of Supervisory Practices in Safety Education in Selected Cities in the United States and Recommendations for the Improvement of Such Practices*. Doctor's thesis. New York: New York University, 1960. 148 pp. Abstract: *Dissertation Abstracts* 21: 2956-57; No. 10, 1961.
- ABERCROMBIE, STANLEY. "Applying Research to Driver Education." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1959. pp. 139-42.
- ALLSTATE INSURANCE COMPANY. *A Teenage Pattern*. Skokie, Ill.: Marketing Research Division, the Company, 1960. 30 pp.
- AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL EDUCATION, AND RECREATION AND AMERICAN DENTAL ASSOCIATION. *Report of Joint Committee on Mouth Protectors*. Washington, D.C.: the Association, a department of the National Education Association, 1960. 24 pp.
- BERGMAN, RITA ELIZABETH. *An Investigation of Adolescent Attitudes Toward Safety*. Doctor's thesis. Bloomington: Indiana University, 1959. 96 pp. Abstract: *Dissertation Abstracts* 20: 3118; No. 8, 1960.
- BLACKBURN, JAMES ROBERT. *Concepts of Driver Education and Their Relative Importance for a Driver Education Course in the Secondary School*. Doctor's thesis. Boston: Boston University School of Education, 1956. 283 pp. Abstract: *Dissertation Abstracts* 17: 571-72; No. 3, 1957.
- BRODY, LEON. "Accidents and Attitudes." *Basic Aspects and Application of the Psychology of Safety*. New York: Center for Safety Education, New York University, 1959. pp. 6-24.

- CAROTHERS, RANDOLPH ERWIN. *A Comparison of Student and Non-Student School Bus Drivers with Regard to Safety, Efficiency and Economy*. Doctor's thesis. Tallahassee: Florida State University, 1959. 181 pp. Abstract: *Dissertation Abstracts* 20: 3143; No. 8, 1960.
- CHAPLIN, JACK WILLIAM. *An Experimental Study of Attitude Modification in Driver Education Students*. Doctor's thesis. Palo Alto, Calif.: Stanford University, 1961. 131 pp. Abstract: *Dissertation Abstracts* 21: 3355-56; No. 11, 1961.
- CORBALLY, JOHN E. "Teaching Safety to Teachers." *Safety Education* 41: 30-32; November 1961.
- CRABTREE, WILLIAM LEE. *Evaluation of the Driver Education Program at Mississippi Southern College and Mississippi State College*. Doctor's thesis. Nashville, Tenn.: George Peabody College for Teachers, 1958. 198 pp. Abstract: *Dissertation Abstracts* 19: 2802; No. 11, 1959.
- CUTTER, WALTER A. "Professional Education." *Accident Prevention: The Role of Physicians and Public Health Workers*. (Edited by Maxwell N. Halsey.) New York: McGraw-Hill Book Co., 1961. Chapter 20, pp. 362-76.
- DZENOWAGIS, JOSEPH G. *Injuries in Men's Physical Education and Intramural Sports*. Safety Monographs for Colleges and Universities, No. 14. Chicago: National Safety Council, 1962. 31 pp.
- ELKOW, J. DUKE. "Safe Living, 1959-1969—A Prediction." *Journal of Health, Physical Education, and Recreation* 30: 21-22; April 1959.
- FLORIO, A. E., and STAFFORD, G. T. *Safety Education*. New York: McGraw-Hill Book Co., 1962. 382 pp.
- FOX, BERNARD H. "Research." *Accident Prevention: The Role of Physicians and Public Health Workers*. (Edited by Maxwell N. Halsey.) New York: McGraw-Hill Book Co., 1961. Chapter 21, pp. 377-87.
- FRIEDMAN, SIMON L. "Tort Liability of Driver Education Teachers." *Journal of Health, Physical Education, and Recreation* 32: 31, 56; February 1961.
- GIBBONS, JOHN W. "Simulators: Research Tools." *Safety Education* 61: 14-15; November 1961.
- HALSEY, MAXWELL N., editor. *Accident Prevention: The Role of Physicians and Public Health Workers*. Published for the American Public Health Association, with the cooperation of the Public Health Service, Department of Health, Education, and Welfare. New York: McGraw-Hill Book Co., 1961. 400 pp.
- HASE, GERALD J. "Accidents Among Elementary School Children." *Journal of Health, Physical Education, and Recreation* 29: 20-21, 80; April 1958.
- HEATH, EARL DAVIS. *The Relationships Between Driving Records, Selected Personality Characteristics and Biographical Data of Traffic Offenders and Non-Offenders: A Study of Selected Personality Characteristics and Selected Biographical Data of Motor Vehicle Traffic Offenders and Non-Offenders and the Relating of Differences Obtained to Records of Their Driving Performance*. Doctor's thesis. New York: New York University, 1957. 212 pp. Abstract: *Dissertation Abstracts* 17: 1949-50; No. 9, 1957.
- HENRY, EARL WINSTON. *Driver Education in Tennessee Public Schools: An Appraisal of Administration, Instruction and Personnel*. Knoxville: University of Tennessee, 1961. 171 pp. Abstract: *Dissertation Abstracts* 22: 1886; No. 6, 1961.
- HETZEL, WALTER L. "Legal Basis of the School Safety Patrol." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1966. pp. 64-70.
- HIGGINS, RUTH. "Plan Safety with Statistics." *Safety Education* 61: 41-43; October 1961.
- JACOB, CARL HERBERT. *The Role of Colleges and Universities in Civil Defense*. Doctor's thesis. Salt Lake City: University of Utah, 1959. 330 pp. Abstract: *Dissertation Abstracts* 20: 961; No. 3, 1959.
- KEY, NORMAN. *Status of Driver Education in the United States*. Washington, D.C.: National Commission on Safety Education, National Education Association, 1960. 76 pp.
- KIGAN, DENIS J. "Tort Liability Affecting Shop Teachers with Provisions for Avoiding Accidents and Litigation." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1960. pp. 70-74.
- KRALOVEC, DALIBOR W. *The Safety Education Program of the Philadelphia Public Schools—Historical Background, Description, and Evaluation*. Doctor's thesis. Phila-

- delphia: Temple University, 1961. 422 pp. Abstract: *Dissertation Abstracts* 22: 140-41; No. 1, 1961.
- LOFT, BERNARD I. "The Effects of Driver Education on Driver Knowledge: Attitudes in Secondary Schools." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1957. pp. 17-22.
- McFARLAND, ROSS A., and MOORE, ROLAND C. "The Epidemiology of Accidents." *Accident Prevention: The Role of Physicians and Public Health Workers*. (Edited by Maxwell N. Halsey.) New York: McGraw-Hill Book Co., 1961. Chapter 3, pp. 17-45.
- MCGLADE, FRANCIS STANLEY. *An Evaluation of the Road Test Phase of the Driver Licensing Examinations of the Various States: An Investigation of Current Road Tests and Testing Procedures, and the Development of a Valid and Reliable Road Test Based on Derived Implications*. Doctor's thesis. New York: New York University, 1960. 276 pp. Abstract: *Dissertation Abstracts* 21: 1101-1102; No. 5, 1960.
- MAHONY, ARTHUR LEO. *Teaching for Attitudes Conducive to Safe Driving: Determination of Valid Principles of Attitude Formation and Their Application To Guide the Teaching of Driver Education and Achievement of Desirable Attitudes*. Doctor's thesis. New York: New York University, 1957. 230 pp. Abstract: *Dissertation Abstracts* 18: 889; No. 3, 1958.
- MALFETTI, JAMES L. "Research Needs in Safety Education." *Journal of Health, Physical Education, and Recreation* 33: 38; January 1962.
- MARSHALL, ROBERT L. *An Analysis of Safety Education Programs in Selected Public Schools of the United States with Recommendations for School Systems in Establishing or Evaluating Safety Education Programs*. Doctor's thesis. Lawrence: University of Kansas, 1961. 321 pp. Abstract: *Dissertation Abstracts* 22: 3908-3909; No. 11, 1962.
- METROPOLITAN LIFE INSURANCE COMPANY, HEALTH AND WELFARE DIVISION, SCHOOL HEALTH BUREAU. *Accident Prevention Can Be Learned*. New York: the Company, 1962. 38 pp.
- NAISBITT, JOHN. "Why They Don't Wear Seat Belts." *Traffic Safety* 58: 10-13, 50; May 1961.
- NATIONAL EDUCATION ASSOCIATION, NATIONAL COMMISSION ON SAFETY EDUCATION. *What Can You Do? Research Needs in Traffic Safety Education*. Washington, D.C.: the Association, 1956. 20 pp.
- NATIONAL EDUCATION ASSOCIATION, NATIONAL COMMISSION ON SAFETY EDUCATION. *A Critical Analysis of Driver Education Research*. Washington, D.C.: the Association, 1957. 60 pp.
- NATIONAL EDUCATION ASSOCIATION, NATIONAL COMMISSION ON SAFETY EDUCATION. *Policies and Practices for Driver Education*. Washington, D.C.: the Association, 1960. 84 pp.
- NATIONAL EDUCATION ASSOCIATION, NATIONAL COMMISSION ON SAFETY EDUCATION. "Driving Simulators—Their Place and Value." *Fifth Annual Conference Proceedings of American Driver Education Association*. Washington, D.C.: American Driver Education Association, 1962. pp. 45-48.
- NATIONAL SAFETY COUNCIL. "Advantages and Disadvantages of the Aetna Drivotrainer and Multiple Car Plan for Driver Education." *National Safety Congress Transactions: School and College Safety*. Chicago: the Council, 1957. pp. 45-47.
- NATIONAL SAFETY COUNCIL. *Accident Facts*. Chicago: the Council, 1961. 96 pp.
- NATIONAL SAFETY COUNCIL. "News of Research." *Safety Education* 41: 28, January; 30, February; 29, March; 29, May 1962. (a)
- NATIONAL SAFETY COUNCIL. *Research Review*: 1-31, March; 1-31, June; 1-32, September 1962. [Supplements to *Traffic Safety* 60: March, June, September 1962.] (b)
- NEW YORK UNIVERSITY, CENTER FOR SAFETY EDUCATION. *Family Recreation and Safety*. New York: the Center, 1961. 80 pp.
- NEW YORK UNIVERSITY, CENTER FOR SAFETY EDUCATION, and NATIONAL SAFETY COUNCIL, SCHOOL AND COLLEGE CONFERENCE. *Research in Safety Education: A Listing of Needed Research, Suggested Problem Outlines, and a Compilation of Selected Studies Now Available in Safety*. New York: the Center, 1956. 36 pp.
- NEYHART, AMOS E. "Driver Education in the Missile Age." *Fifth Annual Conference Proceedings of American Driver Education Association*. Washington, D.C.: American Driver Education Association, 1962. pp. 6-9.

- NIHAN, JAMES FREDERICK. *A Study of State Laws and State Education Department Regulations for Safety Education in the Public Schools of the United States*. Doctor's thesis. New York: New York University, 1961. 352 pp. Abstract: *Dissertation Abstracts* 22: 126-27; No. 1, 1961.
- OJEMANN, RALPH H. *Tests and Evaluation Methods Used in Driver and Safety Education*. Washington, D.C.: National Education Association, 1959. 48 pp.
- PATTERSON, RONALD D. *Recommended Practices and Procedures for the Improvement of Programs for the Selection and Education of School Bus Drivers*. Doctor's thesis. New York: New York University, 1959. 205 pp. Abstract: *Dissertation Abstracts* 20: 3161-62; No. 8, 1960.
- PREECE, THOMAS WILLIAM. *The Selection, Training and Evaluation of School Bus Drivers in California*. Doctor's thesis. Los Angeles: University of Southern California, 1961. 406 pp. Abstract: *Dissertation Abstracts* 22: 1495-96; No. 5, 1961.
- SAFETY EDUCATION. "Safety Education Majors and Minors." *Safety Education* 41: 30-31; May 1962. (a)
- SAFETY EDUCATION. "Study Shows Driver Education Pays Off." *Safety Education* 41: 8; March 1962. (b)
- SAWERS, KENNETH THOMAS. *Non-Directive Group Discussion Techniques in the Teaching of Driver Education in High Schools: An Investigation To Determine What Portions of the Driver Education Course of Study Might Lend Themselves to Non-Directive Group Discussion, and the Development of Materials To Aid the Teacher in Initiating Such Discussion*. Doctor's thesis. New York: New York University, 1960. 186 pp. Abstract: *Dissertation Abstracts* 20: 4569; No. 12, 1960.
- SHEEHE, GORDON H. "Outlook: The Growth and Role of Centers in the Decade Ahead." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1960. pp. 59-64.
- STACK, HERBERT J. "The Origin and Development of College Safety Centers." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1960. pp. 54-56.
- STEERE, NORMAN. "Making Student Accident Records Work." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1957. pp. 88-90.
- STILES (nee Keller), GRACE EILEEN. *Relationships of Unmet Emotional Needs to Accident-Repeating Tendencies in Children*. Doctor's thesis. New York: New York University, 1957. 310 pp. Abstract: *Dissertation Abstracts* 17: 2942; No. 12, 1957.
- STRASSER, MARLAND K. "Status of College Centers for Safety Education." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1960. pp. 57-59.
- TRAFFIC SAFETY. "Seat Belts Hold in Actual Crashes." *Traffic Safety* 52: 10-12; June 1958.
- WEBSTER, DANIEL P. "In Case of Fire." *Safety Education* 41: 14-15; October 1961.
- WILLIAMS, WILLIAM A. "Preferred Safety Practices for Shop Teachers." *National Safety Congress Transactions: School and College Safety*. Chicago: National Safety Council, 1959. pp. 71-72.
- YOST, CHARLES PETER. *An Analysis of Graduate Theses in School Safety in the United States from 1925 to 1950*. Doctor's thesis. Pittsburgh: University of Pittsburgh, 1956. 481 pp. Abstract: *Dissertation Abstracts* 17: 88; No. 1, 1957.
- YOST, CHARLES PETER. "Research in Safety Education." *Safety Education* 38: 5-7, 40; September 1958.
- YOST, CHARLES PETER. *Teaching Safety in the Elementary Schools*. Washington, D.C.: American Association for Health, Physical Education, and Recreation, a department of the National Education Association, 1962. 32 pp.

CHAPTER VIII

Youth Fitness and Health

G. LAWRENCE RARICK and WILLIAM REDDAN

THE UNFAVORABLE reports on the physical fitness of American children and youth and the controversies arising from these reports are partly responsible for the recent increase in research on the dynamic health of children. Equally important in influencing current research trends is the realization that many of today's major health problems are intimately associated with a changing way of life. The advances of medical science have brought the vast majority of communicable diseases under control, but the degenerative diseases which often appear in the prime of life and in frequent association with questionable patterns of living have become a major health problem of this country. Thus, the nature of dynamic health and the significance of physical fitness to the well-being of man have been studied in some detail. Considerable research has been done recently on methods of assessing physical fitness and on appraisal of health and fitness levels of the school-age population. Advances have also been made in methods of improving defined aspects of fitness. However, only meager data are available on the impact which the current emphasis on physical fitness has had upon fitness levels of school children.

This chapter deals with research on (a) nature and assessment of physical fitness, (b) physical fitness of children and youth, (c) factors affecting physical fitness, (d) health of school-age children and youth, and (e) physical education and youth fitness.

Nature and Assessment of Physical Fitness

The current controversies regarding the physical fitness of American school children stem largely from the varying concepts of fitness and from the diverse methods which have been employed in its assessment.

The belief that physical fitness is a general quality and that it can be adequately evaluated by a single test or by a battery of performance tests is not supported by research. It should be recognized that the assessment of physical fitness is a highly complex problem which physiologists have not yet satisfactorily resolved. There is evidence, however, that some aspects of fitness can be defined and measured by physical performance tests; others, by appropriate physiological measures. The collection of research papers released by the University of Illinois, College of Physical

Education (1960), and the reports published in *Health and Fitness in the Modern World*, compiled by Larson (1961), gave particular attention to the physiological facets of fitness. Both sources provided excellent materials on the theoretical and practical problems of physical fitness. Johnson (1960) edited a comprehensive volume dealing with the anatomical, physiological, psychological, and therapeutic aspects of exercise and sports.

Estimates of Physical Fitness by Physical Performance Tests

Physical performance tests have been widely used in the evaluation of physical fitness of school children and of military personnel for more than 30 years. The elements of fitness believed to be measured by physical performance tests include such attributes as muscular strength, agility, endurance, flexibility, and motor coordination. It is held that the individual performing well in these tests is equipped to meet effectively the everyday physical demands of American culture, with adequate reserve left for emergencies. The *AAHPER Youth Fitness Test* (Hunsicker, 1961), composed of a battery of seven tests purporting to measure important components of physical fitness, was given initially to 8,500 boys and girls in grades 5-12. Age norms by sex and norms based on height and weight were published. The University of the State of New York's (1958) *New York State Physical Fitness Test* and the California State Department of Education's (1958) *California Physical Performance Test* were the outgrowth of state research projects, resulting in physical fitness tests similar in nature to the *AAHPER Youth Fitness Test*. Mohr (1961), utilizing the test items of the *AAHPER Youth Fitness Test*, presented norms for college women.

Cardiovascular Measures and Tests of Maximum Oxygen Intake

The use of physiological measures in assessing physical fitness is based on the premise that the measured disturbances in energy equilibrium resulting from exercise and from the time it takes for resting equilibrium to be re-established provide important information on physical fitness. Thus the person with a high level of fitness will perform severe tasks with less disturbance in physiological equilibrium, and his responses will return more rapidly to a level judged to be normal than will the less-fit person. Measurements of energy requirements are usually taken with the subject running or walking on a treadmill. Use of a bicycle ergometer is also made, since the workload can be controlled and skill differences are minimal. The maximum amount of oxygen that can be absorbed per unit of time is used in determining the body's capacity for aerobic work. The

measured amount is a useful index of fitness, particularly of cardiopulmonary function. Obviously, since such a measure requires elaborate instrumentation, it is not feasible for widespread use in schools.

Buskirk and Taylor (1957) reported that the maximum oxygen intake provided a valuable way of describing the maximum oxidative energy available for work, but it proved to be meaningful only when the values were reduced to the oxygen intake per unit of body weight. Contrary to general opinion, these investigators showed that for young men the presence of excess fat per se had no great effect on the cardiopulmonary system's ability to deliver oxygen to the muscles during maximum performance. They found, however, that the overweight individual was at a disadvantage, since the fat being carried did not contribute to the performance.

Taylor and Keys (1958), examining task specificity in fitness, showed that the influence of different stresses upon measures of fitness varied widely. The effect of such stresses as semistarvation, thiamin deficiency, bed rest, and acute starvation differentially affected such measures as speed of hand and arm movement, coordination, strength, maximum oxygen intake, and pulse-rate recovery.

Mitchell, Sproule, and Chapman (1958) questioned the meaning of tests of maximum oxygen intake. These investigators presented evidence indicating that the maximum oxygen intake was a function of both the cardiac output and the AV (arteriovenous oxygen) difference, although they agreed that in the normal individual the cardiac output was the more important factor.

Studies by Astrand (1956), Bengtsson (1956), Adams, Linde, and Miyake (1961), and Rodahl and others (1961) successfully employed oxygen intake tests in measuring the working capacity of children and adolescents.

Physical Fitness of Children and Youth

Considerable research employing the controversial *Kraus-Weber Test*, the *AAHPER Youth Fitness Test*, and tests of maximal oxygen intake has been done on youth fitness. Since it is clear that these three tests do not measure the same aspects of fitness, one would not expect them to produce similar results in identifying the unfit child. However, in administering the *Kraus-Weber Test* and the *California Physical Performance Test* to a sample of fourth-graders in Berkeley, California, Espenschade (1958) reported that the children who failed one strength item or multiple items of the *Kraus-Weber Test* performed more poorly on the average in running, jumping, throwing, and sit-ups than those who passed all items of the *Kraus-Weber Test*. On the other hand, Rodahl and others (1961) found that there were no differences on measures of heart-rate

response to fixed loads, on step-test score, or in maximal oxygen intake between those who passed and those who failed the *Kraus-Weber Test*.

Comparisons Based on Motor Performance Tests

With the development of the *AAHPER Youth Fitness Test*, an opportunity was afforded to make crosscultural fitness studies. The results of the investigations thus far completed verify in part the earlier findings of the *Kraus-Weber Test*. For example, Campbell and Pohndorf (1961) applied the *AAHPER Youth Fitness Test* to more than 10,000 British children within the age range of 10-17 years and demonstrated rather conclusively that British children were superior to American children on almost all measures. Similar findings on Danish children were reported by Knuttgen (1961). These investigators concluded that children in this country seem to be the victims of a way of life which has not yet made its impact on European children.

In a comparative study of the motor performance of California adolescents today with performance scores of adolescents 24 years ago, Espenschade and Meleney (1961) reported no clear-cut differences, although today's boys were superior to boys of 25 years ago on a majority of the items. The opposite finding was noted for girls. Blesh and Scholz (1957), in a 10-year survey of the physical fitness of freshmen entering Yale, reported a failure rate of under 50 percent for the class of 1951, whereas rates of 63 percent and 62 percent were noted for classes of 1959 and 1960, respectively. Thus, although the picture is somewhat clouded, the evidence would seem to point to some deterioration in the physical performance level of today's youth.

Comparisons Based on Physiological Measures

A few physiological studies which give comparative data on the physical working capacities of American and European children have been conducted recently. These studies do not verify the differences between cultures reported in studies employing physical performance tests. In a study of the working capacity of 10-, 11-, and 12-year-old Swedish and California children, Adams and others (1961) found that for those children of comparable ages there was no difference between the cultural groups. In a similar investigation comparing oxygen intake of German, Swedish (Stockholm), and American (Philadelphia) schoolboys, Rodahl and others (1961) found that although there was no significant difference between the German and American youths, the superiority of the Swedish group was clearly evident. Since tests of maximum working capacity are not as likely to be influenced by skill as are motor performance tests, the former are believed to be more valid measures of physical fitness than the latter.

Factors Affecting Physical Fitness

The influence of such factors as age and maturity, sex, physique, and body composition upon physical performance of normal children has received considerable attention in recent years. While the debilitating effects of disease and chronic disability are widely recognized, only limited attempts have been made to ascertain the effects of these adverse conditions upon the working capacity of children. After comparing the exercise tolerance of post-rheumatic and normal boys, Kasch (1961) recommended a method of testing their characteristics. The essential difference in working capacity of the post-rheumatic and the normal boy was due to the relatively low oxygen intake of the post-rheumatic boy. Thus, his respiratory system and heart are required to do approximately twice the work of the normal boy.

Age and Sex

Although it is widely recognized that age and sex factors produce significant differences in strength and physical performance, only limited study has been made of the effect of these factors upon the working capacity of children until recently. Astrand (1956) reported that the maximum oxygen intake per unit of body weight was fairly constant in males over seven years of age, ranging from 56 to 59 ml/O₂/Kg/min. In the age range of 4-9 years, the maximum oxygen intake for boys and girls was similar; but in those over 12 years, the maximum oxygen intake of the girls was about 17 percent lower than that of the boys. In studying the submaximal working capacity of 76 apparently normal Stockholm children, Bengtsson (1956) found that although the oxygen consumption was not related to age or to body weight, it increased linearly with the intensity of the exercise. The research of Adams, Linde, and Miyake (1961) on California children and the work of Rodahl and others (1961) on Philadelphia children support the earlier studies of Astrand (1956) and Bengtsson (1956). All of these studies show considerable individual variability in work capacity. There is the implication that although the sex differences in maximum working capacity in older children are influential, factors of physical condition and motivation are also operating to a substantial degree.

In studying the muscular fatigue curves of boys and girls, Rich (1960) reported that although boys became stronger than girls with advancing age, there were no important age or sex differences in muscular fatigability when fatigability was viewed in relation to initial strength. Buxton (1957), using a modification of the *Kraus-Weber Test*, reported that strength and flexibility items differed with age and sex. Thus, even minimal standards should make appropriate allowances for age and sex.

That body size alone is not a major factor in motor coordination was indicated by Solley (1957), who found that large boys in the age range of 10-14 years performed no better than small boys on tests of motor coordination.

Additional References: Cearley (1957); Glassow and Kruse (1960); Hellebrandt and others (1961).

Physique

Variations in stature and differences in body build have been shown to be factors associated to a significant degree with physical performance. To the extent that performance variables are used in evaluating physical fitness, physique should logically be a factor of some consequence. However, body length was shown by Mathews, Shaw, and Bohnen (1957) and by Broer and Galles (1958) to have no noticeable effect upon hip flexibility in college women. On the other hand, in a study employing 16 strength tests, 10 anthropometric tests, and a series of motor performance tests, Clarke (1957) reported substantial correlations between measures of body structure and strength and motor-performance tests. Likewise, the work of Milicer (1962) in Warsaw on the morphological and performance changes which accompany growth demonstrated the relationship between physical growth patterns and motor performance during the growing years. •

With respect to the influence of body composition upon physical fitness as evaluated by the Army physical fitness test, Riendeau and others (1958) found that body fat rather than weight itself negatively affected all test items.

Health of School-Age Children and Youth

Mortality and Morbidity

The general health of school-age children in terms of mortality and morbidity rates is the best in the history of this country. According to data reported by the Metropolitan Life Insurance Company (1961), the death rate in the age range of 5-14 years declined approximately one-third during the decade from 1948-49 to 1958-59, largely because of reduced mortality from infectious diseases. The drop in death rate during this period was approximately 90 percent for both tuberculosis and acute poliomyelitis and 75 percent for the common communicable diseases of childhood. The decline in mortality rate for appendicitis and heart diseases was of the order of 75 percent and, for pneumonia, approximately 33 percent. However, mortality from malignant neoplasms and from congenital malformations showed an increase during this decade. According to the 1958-59 figures, malignant neoplasms ranked first among all diseases

as a cause of death in the school-age population, with congenital malformation ranking second and pneumonia third. Although the report indicated that the mortality rate for school-age children was low in 1958-59, the incidence of acute illness was high, averaging three illnesses per child, with the majority being acute respiratory diseases. The time lost from school because of acute illness averaged 5.3 days per child.

Children with chronic conditions and physical impairment continue to constitute a major health problem. Approximately 340,000 persons under 21 years of age were receiving care from the U.S. Department of Health, Education, and Welfare, Children's Bureau, Crippled Children's Program (1961). Of this total, congenital malformations accounted for approximately 25 percent; diseases of muscles and bone, 20 percent; cerebral palsy, 8 percent; crippling due to poliomyelitis, 7 percent; eye conditions, 6 percent; and impaired hearing, 5 percent. Although the general health of American children is good, deficiencies which have a long-range effect on health remain a major problem.

Additional Reference: U.S. Department of Health, Education, and Welfare, Public Health Service, National Office of Vital Statistics (1961).

Physical Growth Trends

The accelerated physical growth trend of children today is frequently cited as evidence of their favorable health status. Height-weight data released by the Metropolitan Life Insurance Company (1960) showed that teen-agers in the late 1950's were substantially taller and heavier than adolescents insured between 1885 and 1900. A boy in the age range of 15-16 years was, on the average, 1.8 inches taller than his counterpart before the turn of the century. For girls in this age range, the difference in stature was 0.6 of an inch in favor of those living today. Corresponding differences in weight were noted for both sexes. When weight at a specific height was compared for the two periods, the boys measured in the 1950's in the age span of 15-19 years were three to four pounds heavier than boys of the same age in the earlier study; the differences for girls were less marked.

Comparing the height and weight of youths of military age today with similar data for inductees during World War I and World War II, Karpinos (1961) reported that the recruit in 1957-58 was, on the average, 0.5 inches taller and 7 pounds heavier than was the inductee of World War II, and 1.2 inches taller and 18 pounds heavier than the recruit of World War I. Karpinos pointed out that there was a seemingly disproportionate gain of about 14 pounds in the weight of recent recruits if one makes use of current height-weight standards which provide for a 3-4 pound increase in weight per inch of height. The results of this study provide rather substantial evidence that the problem of obesity in American society is not confined solely to adults.

The favorable effects of vigorous physical activity upon the growth of children and youth were demonstrated by Simon (1961), by Wells and others (1962), and by Milicer (1962). While growth in body length was not affected by the physical activity programs employed, lean body measures increased with a proportionate loss in adipose tissue. Improvements were also noted in the functional capacities of the muscular and cardiopulmonary systems.

Additional Reference: Spurgeon, Young, and Meredith (1959).

Nutritional Aspects of Health

The nutritional status of American children may be judged as good if standards of physical growth are used as criterion measures. Johnson, Burke, and Mayer (1956) indicated that rapid physical growth in itself is not indicative of optimal health. They reported that 10 percent of American children were overweight. The possible adverse effects of excessively rapid growth were reported by Lightwood and others (1956) after a study of young children in Great Britain and Switzerland. Many of those children who grew at unusually rapid rates developed constipation, vomiting, abnormal renal functioning, and hypertension, apparently because of their ingesting large quantities of Vitamin D. As Wilson (1959) pointed out, the nutritional problems of children in most sections of the United States are more frequently related to an overabundance of food and to an oversolicitation in food administration than to a shortage of food.

Considerable research has been done recently on the nutritional status of adolescents. Berryman (1962) pointed out that data compiled from interregional surveys indicated that the calcium intake of teen-age boys and girls is lower than desirable, that the iron intake of adolescent girls is suboptimal, and that the quantity of ascorbic acid and B-complex vitamins in the diets of boys and girls is well below recommended levels. In a study of riboflavin and niacin nutrition as assessed by blood serum levels and subclinical symptoms, Donald, Esselbaugh, and Hard (1962) found that whereas the niacin intake of a sample of boys and girls in the state of Washington was good, the serum-riboflavin levels for both sexes did not compare favorably with current standards. Hard and Esselbaugh (1960), in making cholesterol determinations on 248 adolescents, reported no relationship either between body weight and serum cholesterol or between blood pressure and serum cholesterol. However, the finding that serum cholesterol was significantly higher in boys than in girls suggested that hormone secretion is an important factor regulating cholesterol metabolism in adolescence.

In a longitudinal study of 125 children from 1 to 18 years of age, Burke and others (1962) found wide variations by age and sex in calcium intake. Although the average calcium intake was similar in the sexes for preschool children, during the school years the boys' calcium intake became sub-

stantially higher than the girls'. With the same population, Burke and others (1961) reported that the intake of animal protein followed a similar pattern.

Additional References: Burke and others (1961); Coursin (1962); Stuart (1955); Stunkard (1959).

Physical Education and Youth Fitness

In view of the unfavorable reports on the physical fitness of today's youth, the effectiveness of school physical education programs in improving the fitness levels of children has been questioned. While there is ample research evidence to assure that gains in defined aspects of fitness can be made in relatively brief periods of time, limited published data are available on changing levels of fitness of our school population. However, in Israel, Simon (1961) reported that 14- and 15-year-old children who received six months of daily physical education (six times each week), consisting of track and field athletics and gymnastics, did show much greater gains in motor performance and surprisingly larger gains in chest circumference, respiratory amplitude, arm girth, and shoulder breadth than did children taking the typically less vigorous programs of two days per week. Similar findings were reported by Denisiuk (1962) in Poland, in which a six-hour weekly program of physical education compared with programs of two and three hours per week resulted in distinctly greater improvements in motor performance. Denisiuk also noted that the six-hour-per-week program of physical education did not adversely affect study time, since proportionately less time was devoted to spontaneous play by those in the expanded physical education program.

In this country, Clarke and Wickens (1962) reported that the nature of the physical education program of the boys participating in the Boys' Growth Project at Medford, Oregon, was a significant factor affecting the superior musculature and physical fitness of the subjects in the study group. The effect of the required physical education program upon the physical fitness of Yale freshmen was reported by Blesh and Scholz (1957). They found that only 41 percent of freshmen passed all six fitness tests at the beginning of the year, whereas 80 percent passed after 12-14 weeks of instruction.

Additional References: Asmussen (1958); McCammon and Sexton (1958); President's Council on Youth Fitness (1961); Schneider (1959); Whittle (1961).

Experimental Work on Three Facets of Fitness

Because of the limited data available on changes in fitness levels of large populations of children, the following sections will be devoted to experi-

mental work which has been done on three important facets of fitness: muscular strength, flexibility, and cardiovascular endurance.

Muscular Strength

Measures of muscular strength have been traditionally included in most physical fitness test batteries. Strength is sufficiently important in human physical performance that its development through exercises is routinely used in physical rehabilitation work and in the conditioning of athletes. Although these procedures have been used with considerable success, the physiological mechanisms regulating the development of muscular strength are not clearly understood. There is nearly universal agreement that strength develops only if work is performed in the overload zone. However, the type and intensity of activity necessary to produce the best results are not known.

Considerable work has been done recently on the relative merits of isometric *versus* shortening contractions in the development of strength. Rasch (1961), in a review of research on this problem, stated that since the evidence points to rather basic differences in the physiological mechanisms involved in the two types of contractions, similar results could not be expected. In a comparative study of the electrogenesis of maximal isometric and isotonic contractions, Liberson, Dondey, and Asa (1962) reported that the maximal electrogenesis recorded during an isotonic contraction was only one-fourth of that for an isometric contraction. This finding suggests that there may be some adaptive process within the central nervous system, probably through the gamma system and its subcortical regulators, which limits the force available in a shortening contraction.

Progressive-resistance exercise programs have been used successfully for many years in developing muscular strength and in improving work output. The effect of varying the load and cadence in muscle training was effectively revealed by the work of Hellebrandt (1958). In a study of the effects of progressive weight training on adolescent boys, Kusnitz and Keeney (1958) found that at the end of an eight-week training program, the experimental group exceeded the control group in measures of strength, flexibility, agility, and cardiovascular endurance.

The positive but differential effects of a single daily isometric contraction on the development of static strength of prepubescent and post-pubescent boys were demonstrated by Rarick and Larsen (1958, 1959). Mathews and Kruse (1957) reported that with college men greater gains in strength were made with isometric exercises than with isotonic exercises. However, Rasch and Morehouse (1957) found that males who used isotonic exercises made greater strength gains than those who used isometric exercises. It is questionable whether similar results could be expected, since the training procedures differed. Under isotonic conditions both the angle of pull of the muscle and muscle length change as effort

is applied; whereas, in isometric contractions the muscle is working without altering the length or angle of pull. The evidence now indicates that for the development of static strength isometric exercises are desirable, but for improved work output isotonic exercises produce the best results.

Flexibility

Although flexibility is considered to be of significance in physical fitness, only a limited amount of work has been done recently concerning its relationship with general exercise programs. Lack of flexibility is held by orthopedists to be a factor in low back pain in the middle years of life. De Vries (1962) compared the effect of the static stretching procedures of Hatha Yoga with the more conventional ballistic methods of stretching. After training sessions which ran for seven 30-minute periods, the results disclosed that although both groups made significant gains in flexibility, there was no reliable difference between the methods. In a study with males 14-18 years of age, Leighton (1956) reported that the flexibility characteristics were primarily dependent upon performance abilities which typically change from one age level to the next.

Cardiovascular Endurance

Of the attributes of physical fitness which apparently have the greatest impact on the well-being of adults in the middle and later years of life, cardiovascular functioning is perhaps the most significant. This aspect of fitness, which can be attained through appropriate conditioning procedures, can be retained to a reasonably high degree later in life by a favorable pattern of living. In a study of 360 American and Austrian men between 17 and 50 years of age, Raab and others (1960) effectively indicated that fitness in cardiovascular function may be reduced in the absence of physical activity. The relative length of the isometric period of the left ventricle was used as the criterion measure for either cholinergic or sympathetic preponderance. The data showed that continued lack of physical activity tended not only to produce the adrenergic state with detrimental effects on cardiac efficiency but also to increase the possibility of cardiac damage. This study supports earlier research on the benefits of activity in the adult years.

Only limited data are available on the extent to which men who have been active early in life tend to remain active in the later years.

In a study of 628 former athletes and 563 nonathletic controls, Montoye and others (1957) found that, until the age of 45, former athletes were physically more active than nonathletes, but that after this age the nonathletes were on the average the more active.

The favorable effects of training upon cardiovascular functions are widely known. After studying the effects of conditioning and decondition-

ing on the functional capacity for work, Balke and Clarke (1961) reported that 8-17 weeks of conditioning of previously inactive subjects resulted in an augmented maximum oxygen intake and other evidences of improved work output. On the other hand, a period of seven days of complete relaxation with the subject "floating" in a tank of water to simulate weightlessness resulted in a shocking loss of work output to the point that dyspnea occurred during such mild activity as slow, relaxed walking. Kozinski (1962) reported upon the effect of a three-year period of systematic physical exercise on Polish youth. Although no change appeared in the electrocardiographic curve at rest, the curve following exercise showed a lower rise and smaller deflections in its various segments—a finding indicative of a less strenuous cardiac response.

The specific nature of training is indicated by the work of Nagle and Irwin (1960). In a study of the effect of an eight-week weight-training program upon cardiovascular responses of male college freshmen, results showed rather clearly that this program had no significant effect upon such physiological measures as oxygen intake or carbon dioxide produced per minute, the respiratory exchange ratio, or the ventilatory efficiency.

It is becoming increasingly clear that physical fitness is a composite of many interacting but specific factors. Thus, future research will attempt to identify with some exactness the components of fitness which have the greatest significance for the well-being of children and youth. Meaningful research on methods of improving physical fitness must await the accomplishment of this end.

Bibliography

- ADAMS, FOREST H.; LINDE, LEONARD M.; and MIYAKE, HISAZUMI. "The Physical Working Capacity of Normal School Children. I: California." *Pediatrics* 28: 55-64; July 1961.
- ADAMS, FOREST H., and OTHERS. "The Physical Working Capacity of Normal School Children. II: Swedish City and Country." *Pediatrics* 28: 243-57; August 1961.
- ASTRAND, P. O. "Human Physical Fitness with Special Reference to Sex and Age." *Physiological Reviews* 36: 307-35; July 1956.
- BALKE, BRUNO, and CLARKE, R. T. "Cardio-Pulmonary and Metabolic Effects of Physical Training." *Health and Fitness in the Modern World*. (Compiled by Leonard A. Larson.) Chicago: Athletic Institute, 1961. Chapter 8, pp. 82-87.
- BENGTSSON, ELIAS. "The Working Capacity in Normal Children, Evaluated by Submaximal Exercise on the Bicycle Ergometer and Compared with Adults." *Acta medica Scandinavica* 154: 91-109; 1956.
- BERRYMAN, GEORGE H. "Teen-Age Growth and Diet." *GP* 25: 98-101; March 1962.
- BLESH, T. ERWIN, and SCHOLZ, ALFRED E. "Ten-Year Survey of Physical Fitness Tests at Yale University." *Research Quarterly* 28: 321-26; December 1957.
- BROER, MARION R., and GALLES, NAOMI R. G. "Importance of Relationship Between Various Body Measurements in Performance of the Toe-Touch Test." *Research Quarterly* 29: 253-63; October 1958.
- BURKE, BERTHA S., and OTHERS. "A Longitudinal Study of Animal Protein Intake of Children from One to Eighteen Years of Age." *American Journal of Clinical Nutrition* 9: 616-24; September-October 1961.

- BURKE, BERTHA S., and OTHERS. "A Longitudinal Study of the Calcium Intake of Children from One to Eighteen Years of Age." *American Journal of Clinical Nutrition* 10: 79-88; January 1962.
- BUSKIRK, ELSWORTH, and TAYLOR, HENRY LONGSTREET. "Maximal Oxygen Intake and Its Relation to Body Composition, with Special Reference to Chronic Physical Activity and Obesity." *Journal of Applied Physiology* 11: 72-78; July 1957.
- BUXTON, DORIS. "Extension of the Kraus-Weber Test." *Research Quarterly* 28: 210-17; October 1957.
- CALIFORNIA STATE DEPARTMENT OF EDUCATION. *California Physical Performance Test*. Sacramento: the Department, 1958. 27 pp.
- CAMPBELL, WILLIAM R., and POHNDORF, RICHARD H. "Physical Fitness of British and United States Children." *Health and Fitness in the Modern World*. (Compiled by Leonard A. Larson.) Chicago: Athletic Institute, 1961. Chapter 2, pp. 8-16.
- CLARKE, H. HARRISON. "Relationships of Strength and Anthropometric Measures to Physical Performances Involving the Trunk and Legs." *Research Quarterly* 28: 223-32; October 1957.
- CLARKE, H. HARRISON, and WICKENS, J. STUART. "Maturity, Structural Strength, and Motor Ability Growth Curves of Boys 9 to 15 Years of Age." *Research Quarterly* 33: 26-39; March 1962.
- DENISIUK, LUDWIK. "The Current State of Research in Physical Fitness of School Children in Poland." *Physical Education in School*. (Edited by W. Missiuro and J. Sadowska.) Warsaw, Poland: Institute for Research in Physical Culture, 1962. pp. 69-81.
- DE VRIES, HERBERT A. "Evaluation of Static Stretching Procedures for Improvement of Flexibility." *Research Quarterly* 33: 222-29; May 1962.
- DONALD, ELIZABETH A.; ESSELBAUGH, N. C.; and HARD, M. M. "Nutrition Status of Selected Adolescent Children. V: Riboflavin and Niacin Nutritional Assessed by Serum Level and Subclinical Symptoms in Relation to Dietary Intake." *American Journal of Clinical Nutrition* 10: 68-78; January 1962.
- ESPENSCHADE, ANNA S. "Fitness of Fourth Grade Children." *Research Quarterly* 29: 274-78; October 1958.
- ESPENSCHADE, ANNA S., and MELENEY, HELEN E. "Motor Performances of Adolescent Boys and Girls of Today in Comparison with Those of Twenty-Four Years Ago." *Research Quarterly* 32: 186-89; May 1961.
- HARD, MARGARET M., and ESSELBAUGH, NETTIE C. "Nutritional Status of Adolescent Children. IV: Cholesterol Relationships." *American Journal of Clinical Nutrition* 8: 346-52; May-June 1960.
- HELLEBRANDT, F. A. "Application of the Overload Principle to Muscle Training in Man." *American Journal of Physical Medicine* 37: 278-83; October 1958.
- HUNSICKER, PAUL A. *AAHPER Youth Fitness Test Manual*. Washington, D.C.: American Association for Health, Physical Education, and Recreation, a department of the National Education Association, 1961. 68 pp.
- JOHNSON, MARY LOUISE; BURKE, BERTHA S.; and MAYER, J. "The Prevalence and Incidence of Obesity in a Cross-Section of Elementary and Secondary School Children." *American Journal of Clinical Nutrition* 4: 231-38; May-June 1956.
- JOHNSON, WARREN R., editor. *Science and Medicine of Exercise and Sports*. New York: Harper & Brothers, 1960. 739 pp.
- KARPINOS, BERNARD D. "Current Height and Weight of Youths of Military Age." *Human Biology* 33: 335-54; December 1961.
- KASCH, FRED W. "A Comparison of the Exercise Tolerance of Post-Rheumatic and Normal Boys." *Journal of the Association for Physical and Mental Rehabilitation* 15: 35-40; March-April 1961.
- KNUTTGEN, HOWARD G. "Comparison of Fitness of Danish and American School Children." *Research Quarterly* 32: 190-96; May 1961.
- KOZINSKI, EDWARD. "The Assessment of the Functional Capacity of the Organism in School Children and Youth." *Physical Education in School*. (Edited by W. Missiuro and J. Sadowska.) Warsaw, Poland: Institute for Research in Physical Culture, 1962. pp. 119-31.
- KUSINITZ, IVAN, and KEENEY, CLIFFORD E. "Effects of Progressive Weight Training on Health and Physical Fitness of Adolescent Boys." *Research Quarterly* 29: 294-301; October 1958.

- LARSON, LEONARD A., compiler. *Health and Fitness in the Modern World*. Chicago: Athletic Institute, 1961. 392 pp.
- LEIGHTON, JACK R. "Flexibility Characteristics of Males Ten to Eighteen Years of Age." *Archives of Physical Medicine and Rehabilitation* 37: 494-99; August 1956.
- LIBERSON, W. T.; DONDEY, MAX; and ASA, M. MAXIM. "Brief Repeated Isometric Maximal Exercises." *American Journal of Physical Medicine* 41: 3-14; February 1962.
- LIGHTWOOD, REGINALD, and OTHERS. "Infantile Hypercalcaemia." *British Medical Journal* 1: 345-46; February 11, 1956.
- MATHEWS, DONALD K., and KRUSE, ROBERT. "Effects of Isometric and Isotonic Exercises on Elbow Flexor Muscle Groups." *Research Quarterly* 28: 26-37; March 1957.
- MATHEWS, DONALD K.; SHAW, VIRGINIA; and BOHNEN, MELRA. "Hip Flexibility of College Women as Related to Length of Body Segments." *Research Quarterly* 28: 352-56; December 1957.
- METROPOLITAN LIFE INSURANCE COMPANY. "Growth Trends in the Teen Ages." *Statistical Bulletin* 41: 3-6; October 1960.
- METROPOLITAN LIFE INSURANCE COMPANY. "Health of the School-Age Population." *Statistical Bulletin* 42: 1-3; August 1961.
- MILICER, HALINA. "Investigations on the Physical Development of Youth." *Physical Education in School*. (Edited by W. Missiuro and J. Sadowska.) Warsaw, Poland: Institute for Research in Physical Culture, 1962. pp. 45-66.
- MITCHELL, JERE H.; SPROULE, BRIAN J.; and CHAPMAN, CARLETON B. "The Physiological Meaning of the Maximal Oxygen Intake Test." *Journal of Clinical Investigation* 37: 538-47; April 1958.
- MOHR, DOROTHY R. "Fitness Test Norms for College Women." *Journal of Health, Physical Education, and Recreation* 32: 28-29; September 1961.
- MONTROYE, HENRY J., and OTHERS. *The Longevity and Morbidity of College Athletes*. Indianapolis, Ind.: Phi Epsilon Kappa Fraternity, 1957. 139 pp.
- NAGLE, FRANCES J., and IRWIN, LESLIE W. "Effects of Two Systems of Weight Training on Circulorespiratory Endurance and Related Physiological Factors." *Research Quarterly* 31: 607-15; December 1960.
- RAAB, WILHELM, and OTHERS. "Cardiac Adrenergic Preponderance Due to Lack of Physical Exercise and Its Pathogenic Implications." *American Journal of Cardiology* 5: 300-20; March 1960.
- RARICK, G. LAWRENCE, and LARSEN, GENE L. "Observations on Frequency and Intensity of Isometric Muscular Effort in Developing Static Muscular Strength in Post-Pubescent Males." *Research Quarterly* 29: 333-41; October 1958.
- RARICK, G. LAWRENCE, and LARSEN, GENE L. "The Effects of Variations in the Intensity and Frequency of Isometric Muscular Effort on the Development of Static Muscular Strength in Pre-Pubescent Males." *Internationale zeitschrift für angewandte physiologie einschliesslich arbeitsphysiologie* 18: 13-21; September 1959.
- RASCH, PHILIP J. "Progressive Resistance Exercise: Isotonic and Isometric: A Review." *Journal of the Association for Physical and Mental Rehabilitation* 15: 45-50, 56; March-April 1961.
- RASCH, PHILIP J., and MOREHOUSE, LAURENCE E. "Effect of Static and Dynamic Exercise on Muscular Strength and Hypertrophy." *Journal of Applied Physiology* 11: 29-34; July 1957.
- RICH, GEORGE Q. "Muscular Fatigue Curves of Boys and Girls." *Research Quarterly* 31: 485-98; October 1960.
- RIENDEAU, R. P., and OTHERS. "Relationships of Body Fat to Motor Fitness Test Scores." *Research Quarterly* 29: 200-203; May 1958.
- RODAHL, KAARE, and OTHERS. "Physical Work Capacity." *Archives of Environmental Health* 2: 499-510; January-June 1961.
- SIMON, ERNST. "Morphological and Functional Development in Physical Education." *Health and Fitness in the Modern World*. (Compiled by Leonard A. Larson.) Chicago: Athletic Institute, 1961. Chapter 4, pp. 31-42.
- SOLLEY, WILLIAM H. "Ratio of Physical Development as a Factor in Motor Co-Ordination of Boys Ages 10-14." *Research Quarterly* 28: 295-304; October 1957.
- TAYLOR, HENRY LONGSTREET, and KEYS, ANCEL. "Criteria for Fitness and Comments on Negative Nitrogen Balance." *Annals of the New York Academy of Sciences* 73: 465-75; September 1958.

- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, CHILDREN'S BUREAU, CRIPPLED CHILDREN'S PROGRAM. *Crippled Children's Program Statistics*, 1959. Statistical Series No. 63. Washington, D.C.: Government Printing Office, 1961. 24 pp.
- UNIVERSITY OF ILLINOIS, COLLEGE OF PHYSICAL EDUCATION. *Exercise and Fitness*. Chicago: Athletic Institute, 1960. 248 pp.
- UNIVERSITY OF THE STATE OF NEW YORK. *The New York State Physical Fitness Test*. Albany: New York State Department of Education, 1958. 62 pp.
- WELLS, JOHN B., and OTHERS. "Fitness and Fatness." *Physical Education in School*. (Edited by W. Missiuro and J. Sadowska.) Warsaw, Poland: Institute for Research in Physical Culture, 1962. pp. 27-43.
- WILSON, JAMES L. "Nutrition in Childhood and Adolescence." *Federation Proceedings of the American Societies for Experimental Biology*. Vol. 18, Part II, Supplement No. 3, July 1959. pp. 17-21.

Additional References

- ASMUSSEN, ERLING. "Some Factors Influencing the Physical Capacities of Children." *FIEP* [Fédération internationale d'éducation physique] *Bulletin* 1: 10-13; 1958.
- BURKE, BERTHA S., and OTHERS. "Relationships Between Animal Protein, Total Protein, and Total Caloric Intakes in the Diets of Children from One to Eighteen Years of Age." *American Journal of Clinical Nutrition* 9: 729-34; November-December 1961.
- CEARLEY, JESS E. "Linearity of Contributions of Ages, Heights, and Weights to Prediction of Track and Field Performances." *Research Quarterly* 28: 218-22; October 1957.
- COURSIN, DAVID B. "Nutrition in Adolescence." *Missouri Medicine* 59: 329-36; April 1962.
- GLASSOW, RUTH B., and KRUSE, PAULINE. "Motor Performance of Girls Ages Six to Fourteen Years." *Research Quarterly* 31: 426-33; October 1960.
- HELLEBRANDT, F. A., and OTHERS. "Physiological Analysis of Basic Motor Skills. I: Growth and Development of Jumping." *American Journal of Physical Medicine* 40: 14-25; February 1961.
- MCCAMMON, ROBERT W., and SEXTON, ALAN W. "Implications of Longitudinal Research in Fitness Programs." *Journal of the American Medical Association* 168: 1440-45; November 15, 1958.
- PRESIDENT'S COUNCIL ON YOUTH FITNESS. *Youth Physical Fitness*. Washington, D.C.: Government Printing Office, 1961. 111 pp.
- SCHNEIDER, ELSA. *Physical Education in Urban Elementary Schools*. U.S. Department of Health, Education, and Welfare. Washington, D.C.: Government Printing Office, 1959. 91 pp.
- SURGEON, JOHN H.; YOUNG, NORMA D.; and MEREDITH, HOWARD V. "Body Size and Form of American-Born Boys of Dutch Ancestry Residing in Michigan." *Growth* 23: 55-71; March 1959.
- STUART, HAROLD C. "Obesity in Childhood." *Quarterly Review of Pediatrics* 10: 131-45; August 1955.
- STUNKARD, ALBERT. "Physical Activity, Emotions, and Human Obesity." *American Practitioner and Digest of Treatment* 10: 1500-1501; September 1959.
- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL OFFICE OF VITAL STATISTICS. *Mortality from Selected Causes, by Age, Race, and Sex: United States, 1959*. Washington, D.C.: Government Printing Office, 1961. 42 pp.
- WHITTLE, H. DOUGLAS. "Effects of Elementary School Physical Education upon Aspects of Physical, Motor, and Personality Development." *Research Quarterly* 32: 249-60; May 1961.

CHAPTER IX

Somatic-Psychological Interaction in Physical and Mental Health

FRANKLIN C. SHONTZ

THE AREA of investigation implied by the title, "Somatic-Psychological Interaction in Physical and Mental Health," is extremely broad, and an accelerated interest in the subject has been shown by a wide variety of specialists both in medicine and in the behavioral sciences. Further, since the REVIEW has not previously devoted a special chapter to the question of somatic-psychological interaction in physical and mental health, the reviewer's task is doubly difficult, for the subject contains neither inherent nor previously established organization.

To overcome these difficulties, it has been necessary to limit the purposes of the present chapter and to adopt certain strategies of reference selection and classification. This chapter has therefore been designed to provide the reader only a broad introduction to the general field as well as sources that will guide his efforts to obtain more detailed and particularized information. Emphasis has been placed upon publications which review, summarize, or criticize research and theory on relevant subjects. Compendiums and symposiums have also been granted places of special importance. Specific research reports have been cited primarily to illustrate key issues or to exemplify techniques and important points of methodology. The reviewer has permitted himself latitude to make broad interpretive statements about general problems and trends, and thematic continuity has been provided by beginning with the basic issues of definition and by progressing to more specific fields of empirical investigation.

Basic Conceptual Problems

Soma and Psyche

According to many modern authorities, it is no longer possible to discuss the interaction of somatic and psychological events, for the ancient distinction between body and mind no longer exists. On the philosophical level, the metaphysical mind-body problem is said to have been laid to rest by Ryle (1949), who demonstrated the absurdity of seeking causal relations between these two entirely different logical categories. On the clinical level, the distinction between somatic and psychological events was obliterated by the psychobiological doctrine that since man is a unified whole he can be appreciated only as an organized totality.

One form of response to these conceptual developments has been the institution of the large-scale team approach to psychosomatic research. This approach seeks to meet the demands of psychobiological doctrine by focusing the skills of a variety of highly trained specialists on a single research problem and integrating the findings of each specialist into an over-all explanation of organismic processes. Ruesch (1961) noted, however, that research of this type has not produced many truly causal, explanatory propositions for two reasons: First, every specialist on the team is confined to the verbal system of his own discipline. Second, it is not possible to integrate disparate semantic systems with logical consistency. Consequently, although modern research has effected the discovery of large numbers of transactional—that is, correlational—hypotheses, it has not explained the mechanisms that mediate between inner experience and bodily states.

The prominent philosopher of science, Feigl (1959), has suggested that the mind-body dilemma is not, in fact, dead. It has only been repressed; for, in various forms of more or less effective disguise, the distinction between soma and psyche continues to be employed and to influence man's views of himself.

For example, the mind-body distinction is implicit in White's (1956) opposition of the somatogenic and psychogenic hypotheses. The former postulates a physiological basis for behavioral disturbances and proposes that mental diseases are, in essence, disorders of the body. The latter postulates that behavioral disorders originate in emotional or ideational—that is, mental—processes that have become disordered through motivational conflict and subsequent anxiety. Neither hypothesis, taken in extreme form, asserts an actual interaction of mind and body; but both represent points of view toward which theories, however holistic in intention, tend to polarize.

Penfield and Roberts (1959) felt it necessary to accept the dualistic distinction between the brain, as a physical organ of the body, and the mind, as a psychological reality. They concluded that their work demanded the adoption of a kind of practical mind-brain interactionism which, despite its metaphysical deficiencies, remains at least consistent with the dictates of "busy common sense."

The functioning language of the study of the human being, which also remains markedly dualistic, strongly suggests the implicit belief that mind and body somehow interact upon each other. The phrase "psychosomatic medicine" continues to suggest that mental processes in some way bring about adverse physiological states, although both Hinkle (1961) and Wolff (1962), for example, concluded their studies with the argument that psychosomatic disease does not require a new or separate category of illness or of medicine. Similarly, the term "somatopsychology" proposed by Barker and others (1953), though focused upon the social psychology of physique and disability, seems to imply a concern with the direct influence of somatic states upon psychological events. This influence is implied despite the repeated finding reported by Wright (1960, pp. 373-77) that the phys-

ical properties of disabilities are not reflected in any consistent fashion in the lives of those who possess them.

Current General Trends

Although science continues to employ language that implies a distinction between the events of the body and the events of experience, it is indeed a rarity to find this distinction openly accepted and promulgated in print. What has replaced the openly admitted mind-body dichotomy? Is it a truly useful conception of the person-as-a-totality? It is probably not.

If there is any general trend in recent years, it is toward a renewed interest in the somatogenic hypothesis as a counterbalance to the one-sided stress upon psychological determinants that have characterized behavioral science for at least two decades. This renewed interest derives support from many sources: e.g., the striking progress in research on brain functioning, the rapid proliferation of hallucinogenic and psychoactive drugs, and the significant advances in the construction of machines that closely parallel human activities in their behavior.

Bailey's (1960) views epitomize this trend. He attacked "psychodynamic" explanations of behavior as being the descendants of ancient ideas about the mystical concept of the soul. He contrasted these explanations with the modern "psychobiological" approach that in being essentially monistic deals solely with brain, not at all with mind, as a determinant of behavior. He stressed the advantages of a mechanistic concept of brain function and emphasized the superiority of this more nearly scientific approach over the theological thinking of the psychodynamicists.

Perhaps the revival, in some places, of an enthusiasm for rejecting psychological explanations in favor of mechanical or chemical analyses is but the beginning of a swing of history's pendulum. At least, it is now clear that the hegemony of the psychogenic hypothesis has been challenged and that any attempt to reinstate its supremacy will have to account for a far more sophisticated physical technology than existed in the early days of Sigmund Freud.

Additional References: Alexander (1962); Ciba Foundation (1958); Ehrenthel (1959); Featherstone and Simon (1959); Feibleman (1961); Hook (1960); Kubie (1960); Levin (1960); McCartan (1961); McGeer (1962); Spiegel (1957); Szasz (1960).

Reactions to Physical Illness and Stress

It is gratifying to note that philosophical confusion has not diminished productive empirical investigation. Since the relevant literature has been expanding rapidly, three broad content areas have been selected for special attention. First, there are the attempts to identify particular patterns of

personality with particular disease entities or somatic states. Second, there are the efforts to deal with the longer range psychological problems that accrue to the person who has a permanent physical disability. Third, there exists considerable interest in reactions to crisis and stress that result either from the sudden realization of an illness or from the physiological changes it imposes.

Disease and Personality

Two general approaches characterize the study of this aspect of somatic-psychological interaction. The first seeks to identify common underlying personality traits or characteristics among persons with similar medical or somatic conditions. The second seeks a common physiological denominator among persons displaying the same behavioral or psychological abnormality.

Most characteristic of the first method are the attempts to validate the so-called specificity hypothesis by demonstrating that particular somatic pathologies occur in persons with uniquely identifiable personality traits. Examples of these efforts are afforded by the work of Fisher and Cleveland (1958), who felt that they had shown that different types of somatic pathologies are systematically associated with different kinds of responses to ink-blot tests and that the "body image" (essentially psychological) plays an important role in determining the site at which pathological somatic conditions will occur. On the negative side of the ledger, Tizard (1962) reviewed the literature on the personality of epileptics and concluded that the evidence does not support the theory that all or most epileptics have a characteristic mode of adjustment. Cohen (1962) reviewed the literature on multiple sclerosis from 1950 to 1961 and concluded that research has failed to turn up evidence for the existence of a typical "MS personality." Paley, Nacman, and Dressler (1962) expressed the opinion that most of the personality features thought to be characteristic of tuberculous patients are a function of the kind of institutional treatment that these patients have customarily received.

The second method of approach may be exemplified by the work of Paffenbarger and others (1961). These investigators examined the medical records of all hospitals with psychiatric services in a large Midwestern community. Covering an 18-year span, they selected the records of those patients who manifested pregnancy-related psychotic disturbance. Analysis of these records led the authors to postulate that postpartum psychosis is probably of somatic, rather than "merely psychic," origin. Using similar methodology, Wertheimer (1961) conducted a survey of the medical records of 2,658 institutionalized subjects which led her to propose that a certain kind of schizophrenia is in reality a manifestation of rheumatic brain involvement.

This second method of approach has received strong additional support from the recent successes of somatic treatments for behavioral disorders, since it is tempting to draw the (erroneous) inference that abnormal behavioral states that yield to somatic treatments must have a somatic cause. This chapter cannot consider this important problem in detail; however, the reader is referred to an excellent source by Kalinowsky and Hoch (1961), which reviews research in the area and notes that somatic treatments, valuable as empirical therapies^c but poorly understood, have not lived up to the claims originally made for them and have yet to shed new light on the etiology of mental disorder. Kety (1959a, b) reviewed much of the research on the bases and etiology of schizophrenia. He indicated that most of the claims of biochemical bases for schizoid personalities and behavior tend to be unsubstantiated when given further rigorous testing. He pointed out that much research in this field has been done without taking into consideration the dietary situations and general conditions surrounding psychotics in institutions. His major conclusions are that (a) many of the hypotheses being examined are worthy of further testing in rigorous settings, and (b) the combination of hereditary factors and socioenvironmental factors tends to offer promising leads.

It seems premature to presume that either of the two general methods of study outlined here has yet established a clear superiority over the other. Both customarily begin with the full complexity of clinical phenomena and seek to ferret out common underlying processes; hence both suffer from the uncertainties of control that are inevitable in this type of investigation. In both methods there is the danger of capitalizing on chance—that is, of claiming validity for findings that would not hold up in subsequent investigation. However, this danger could be overcome if research were more frequently repeated than is currently the practice. A greater danger lies in the possible temptation to identify correlation with cause. It is important that hypotheses based on clinical or epidemiological studies, such as those cited, be retested under rigidly controlled conditions so that causative inferences may be confirmed with some reasonable assurance of their correctness. The trouble is that few investigators ever seem to attempt this. Thus, suggestive evidence accumulates in great mounds while man's intellect apparently balks at the prospect of determining the certainty of the validity of one hypothesis before moving on to the generation of more.

Additional References: Brown (1958); Epstein (1961); Greenfield (1958); Kalis and others (1961); Klaber (1960); Simon, Herbert, and Straus (1961); Vernier, Stafford, and Krugman (1958); Weiss and Emmerich (1962).

Psychological Aspects of Disability

Two recent general texts cover quite thoroughly the field of psychological aspects of disability and serve as an excellent introduction to the interested

reader. Wright (1960) dealt at length with the psychological aspects of disability. Her book possesses the continuity that can only appear in the work of a single author. Garrett and Levine (1962) edited a collection of papers that deals with a wide range of illnesses and disabilities. Each chapter was written by an expert in the particular subject covered by that chapter. Probably the books of both Wright and Garrett and Levine will become standard references in this field, and a familiarity with their contents puts one in a position to evaluate more critically specific research reports and published opinions.

A particularly competent investigation was recently reported by Cowen and others (1961), who examined with especially devised and selected instruments the adjustment problems of children with visual disabilities. These authors found no evidence of poorer adjustment among the visually disabled than among controls. There was, in fact, a tendency of better adjustment to occur in the home-living disabled group with greater visual involvement. In all groups, degree of maternal understanding of the child correlated positively with the child's level of adjustment. However, the degree of maternal understanding was not found to be related to the mothers' publicly expressed attitudes about child rearing.

Not all research in this field has been successful in providing information that can be accepted with confidence. A case in point is the study by Ryan (1961) of the dreams of 19 patients with paraplegia. Dreams appear to offer an excellent source of information about the problem of adjustment to disability, yet this study by Ryan is one of the very few on the subject. Unfortunately, no controls were used, and no allowance was made for possible rater bias. Dreams from the same person were treated as independent events, and no statistical analysis was employed. Hence, although this work can be considered suggestive of a potentially useful source of data, the author's conclusions about the psychological problems of his subjects cannot be considered acceptable until they are confirmed by more carefully controlled research.

The study of the psychological aspects of disability has long been closely connected with the field of vocational rehabilitation, as is evident in the volume edited by Wright (1959). Research in the area has frequently (and naively) identified therapeutic success with vocational accomplishment. Shontz and Fink (1961) proposed one method for evaluating the psychological success of rehabilitation with severely disabled persons, that is, those for whom vocational pursuits are unfeasible. The authors' technique, which utilized adjustment ratings made by medical personnel, is notable not for the newness of its approach but for its attempt to evaluate adjustment in terms other than those imposed by the "dollar criterion." It also typifies what seems to be an increasing effort to understand the person with a disability as a total person, not merely as a broken machine requiring mechanical repairs for the restoration of its economic usability.

The study of adjustment to disability has also been hampered by the lack of testable theory. It has been clinically recognized—as pointed out by

Zane (1959)—that success in rehabilitation depends heavily upon the personality of the patient. Gelb (1961) noted that reaction to physical disability frequently serves as a camouflage for basically psychopathological processes. Weinstein and Kahn (1955) produced a classic study and analysis of the psychological mechanism of denial in persons with certain kinds of disabilities. Shontz (1962) observed that there seems to be a common process of adjustment to severe disability. Dembo, Leviton, and Wright (1956) described the problem of adjustment to disability in terms of reactions to loss and the misfortune phenomena; and Wright (1960) applied a consistent self-theory approach to the analysis of reactions to disability. It should be noted that none of these views is strongly buttressed by extensive bodies of theoretically derived empirical research. They constitute largely inferential, integrative summaries of existing knowledge, and few are so systematically stated as to generate readily testable, unequivocal hypotheses easily stated in operational terms.

However, the study of psychological aspects of disability has not been restricted to concern with global problems of personality. There has also been considerable interest in more specifically researchable problems. For example, a series of studies on the effects of hemiplegia upon perception has been reported by Birch and others (1960). These workers found in certain hemiplegic individuals consistent rotations of the visual field that might well influence responses to rehabilitative therapies such as ambulative training.

Attempts have also been made, usually with limited success, to show that somatic disabilities are represented in human figure drawings. The studies of Johnson and Wawrzaszek (1961) and of Schmidt and McGowan (1959) are typical. Fink and Shontz (1960) demonstrated that the body-part size judgments of older persons with chronic physical illnesses show significant constriction. Worchel (1962) conducted a careful investigation of space perception in the blind.

These researchers represent attacks upon problems that are readily amenable to empirical investigation. There exists, therefore, some evidence of a movement toward improved systematic statements and analyses of problems and toward increased sophistication of methodological approaches in this field of investigation, which is still in its beginning stages.

Additional References: Birch, Proctor, and Bortner (1961a, b); Birch and others (1960); Lebovits and Lakin (1957); Levi (1961); Levine (1960); Meyerson (1961); Mueller (1962); Myklebust (1960); Norris, Spaulding, and Brodie (1957); Riklan, Weiner, and Diller (1959); Shatin, Brown, and Loizeaux (1961); Shontz, Fink, and Hallenbeck (1960); Thume and Murphree (1961); Wachs and Zaks (1960).

Reactions to Stress

Research on this subject has been most generally characterized by an interest in establishing the truth of the dictum that stressful situations pro-

duce untoward adaptive responses of widely varying kinds. Especially influential in arousing interest in this area was the now-classical work of Selye (1956), who discovered a common physiological pattern in a variety of responses to nonspecific somatic or psychological stress. An example of a typical recent study is afforded by the work of Roessler and Greenfield (1961), who compared the medical records of 471 college students receiving outpatient psychiatric care with those of 480 students selected at random. These authors concluded that the students under psychiatric treatment had experienced significantly more physical illnesses than the controls. Their data, of course, did not permit drawing causal inferences; they merely suggested that stress tends to be a function of the total person and to manifest itself in a variety of organismic disturbances.

Perhaps the most intensive investigation of psychological reactions to somatic crisis in the recent literature is the thorough study reported by Janis (1958), who investigated the significance and meaning of surgery. Janis concluded that the "work of worrying" is essential to adequate adaptation in surgical stress. Too much or too little anxiety is maladaptive; if anything, the latter is more violently disruptive of behavior than the former.

A related subject of considerable concern is the study of the experience of pain as it correlates with, or fails to correlate with, objective somatic damage. The most comprehensive publication in this area is undoubtedly the recent volume by Beecher (1959), who critically reviewed hundreds of articles on the subject and presented data exemplifying his own methodological approach. Beecher asserted that pain consists of at least two components, the physiological and the psychic. Of these, the latter is the more important, since it determines the degree of suffering in real, as opposed to laboratory, situations.

A rapid growth of interest in the phenomena associated with sensory deprivation has occurred during the past six years. An important research collection on this subject is presented in a volume edited by Solomon and others (1961). The relevance of these studies to the subject at hand becomes apparent when it is realized that more than one study on the disrupting effects of sensory isolation has used the iron lung as a nearly ready-made experimental cubicle. The investigation by Mendelson, Solomon, and Lindemann (1958) is representative. At least one author—notably, Rosenzweig (1959)—has argued that sensory deprivation produces "model" schizophrenics. Ziskind and others (1960) observed severe sensory and mental disturbances in patients wearing eye patches after surgery for cataract extraction or treatment for detachment of the retina.

Mention should be made of certain studies attempting to demonstrate that naturally occurring life events produce a variety of organismic disturbances. For example, interest has been shown in the study of pregnancy as a stressful situation. In a cross-sectional research, Grimm (1961) used projective devices to demonstrate that psychological tension in pregnant women tends to rise in the last half of the third trimester and that extreme tension

correlates with a higher incidence of such undesirable outcomes of the pregnancy experience as high weight gain, prolonged second-stage labor, higher incidence of infant death, and deformity.

Research workers on such studies frequently comment upon the crudeness of their measures. Moreover, many designs lack adequate controls. Here, as elsewhere, there is always the possibility that somatic conditions predisposing to the occurrence of the birth of a deformed child, for example, provide the basis for the psychological disturbances that anticipate the unfortunate event. A worker in this kind of research has to be especially careful not to permit a psychogenic or somatogenic bias to color his conclusions.

Finally, but by no means exhaustively, some recognition must be afforded the wide group of studies represented by those appearing in the volume edited by Uhr and Miller (1960) on the effects of psychoactive drugs as, broadly speaking, stress-inducing agents in nonpsychotic individuals. One such study, which is notable for its meticulousness, was recently reported by Hawkins and others (1961). This research utilized a complex, double-blind, double-Latin square design to study the effects of four active drugs and an inert control substance on 10 paid, volunteer subjects (advanced medical students). It was found that, except at high dosages and except for powerful drugs, individual personality differences in responsiveness were so marked as to mask specific drug action.

Mechanic (1962) and Szasz (1957) placed interpretive emphasis on social and interpersonal factors as critical in determining reactions to the drugs. Shapiro (1959) noted that the knowledge of the possibility that a placebo would be used probably has influenced results considerably in studies employing psychoactive drugs. The implications of this critique may be taken to reinforce Bescher's (1959) position that the laboratory situation cannot satisfactorily eliminate the real-life meanings that influence behavior, often more strongly than even grossly disturbed physiological states.

Additional References: Brady (1958); Davids, DeVault, and Talmadge (1961); Freedman and others (1961); Matarazzo, Matarazzo, and Saslow (1961); Meyer (1955); Murphy and others (1962 a, b); Stoller and Estess (1960); Titchener and Levine (1960).

Conclusion

A survey of the work on the subject of somatic-psychological interaction produces a general sense that a vast array of fascinating facts is being generated, but that no satisfactory unifying principles have emerged to tie these facts together into a meaningful theoretical conception of the human being. Ruesch's (1961) implied caution that the psychological realm and the somatic realm involve separate areas of discourse rings in one's ears again and again. Unfortunately, the literature has not yet produced a new

kind of discourse that makes communication easier. The mind-body problem is as recalcitrant as it ever was, and it is all the more present in view of recent developments in research. It deserves to be unrepressed and brought to light once more, not with a view to solving it in any metaphysical sense but with a view to specifying the alternatives and their implications more clearly. In fact, there are as many potential integrations of these data as there are possible conceptual positions on which to take a stand. It would constitute considerably more than a mere intellectual exercise to attempt these integrations, for each could be made to bear real fruit in the form of organized and integrated research. Without such organization there can be no explanatory science of the human being.

Bibliography

- BAILEY, PERCIVAL. "Modern Attitudes Toward the Relationship of the Brain to Behavior." *Archives of General Psychiatry* 2: 361-78; April 1960.
- BARKER, ROGER G., and OTHERS. *Adjustment to Physical Handicap and Illness: A Survey of the Social Psychology of Physique and Disability*. Bulletin No. 55. Revised edition. New York: Social Science Research Council, 1953. 440 pp.
- BEECHER, HENRY K. *Measurement of Subjective Responses*. New York: Oxford University Press, 1959. 494 pp.
- BIRCH, HERBERT G., and OTHERS. "Perception in Hemiplegia: I. Judgment of Vertical and Horizontal by Hemiplegic Patients." *Archives of Physical Medicine and Rehabilitation* 41: 19-27; January 1960.
- COHEN, ALBERT. "Personality Aspects of Multiple Sclerosis." *Journal of Rehabilitation* 28: 18-20, 50-51; May-June 1962.
- COWEN, EMORY L., and OTHERS. *Adjustment to Visual Disability in Adolescence*. New York: American Foundation for the Blind, 1961. 239 pp.
- DEMBO, TAMARA; LEVITON, GLORIA L.; and WRIGHT, BEATRICE A. "Adjustment to Misfortune—A Problem of Social-Psychological Rehabilitation." *Artificial Limbs* 3: 4-62; Autumn 1956.
- FEIGL, HERBERT. "Philosophical Embarrassments of Psychology." *American Psychologist* 14: 115-28; March 1959.
- FINK, STEPHEN L., and SHONTZ, FRANKLIN C. "Body-Image Disturbances in Chronically Ill Individuals." *Journal of Nervous and Mental Disease*, 131: 234-40; September 1960.
- FISHER, SEYMOUR, and CLEVELAND, SIDNEY E. *Body Image and Personality*. Princeton, N.J.: D. Van Nostrand Co., 1958. 420 pp.
- GARRETT, JAMES F., and LEVINE, EDNA S., editors. *Psychological Practices with the Physically Disabled*. New York: Columbia University Press, 1962. 463 pp.
- GELB, LESTER A. "Personality Disorganization Camouflaged by Physical Handicaps." *Mental Hygiene* 45: 207-15; April 1961.
- GRIMM, ELAINE R. "Psychological Tension in Pregnancy." *Psychosomatic Medicine* 23: 520-27; November-December 1961.
- HAWKINS, DAVID R., and OTHERS. "A Multivariant Psychopharmacologic Study in Normals." *Psychosomatic Medicine* 23: 1-17; January-February 1961.
- HINKLE, LAWRENCE E. "Ecological Observations of the Relation of Physical Illness, Mental Illness, and the Social Environment." (Discussion by Paul V. Lemkau.) *Psychosomatic Medicine* 23: 289-96; July-August 1961.
- JANIS, IRVING L. *Psychological Stress*. New York: John Wiley & Sons, 1958. 439 pp.
- JOHNSON, ORVAL G., and WAWRZASZEK, FRANK. "Psychologists' Judgments of Physical Handicap from H-T P Drawings." *Journal of Consulting Psychology* 25: 284-87; August 1961.
- KALINOWSKY, LOTHAR B., and HOCH, PAUL H. *Somatic Treatments in Psychiatry*. New York: Grune & Stratton, 1961. 413 pp.
- KETY, S. S. "Biochemical Theories of Schizophrenia." Part I. *Science* 129: 1528-32; June 5, 1959. (a)

- KETY, S. S. "Biochemical Theories of Schizophrenia." Part II. *Science* 129: 1590-96; June 12, 1959. (b)
- MECHANIC, DAVID. "The Concept of Illness Behavior." *Journal of Chronic Diseases* 15: 189-94; February 1962.
- MENDELSON, JACK; SOLOMON, PHILIP; and LINDEMANN, ERICH. "Hallucinations of Poliomyelitis Patients During Treatment in a Respirator." *Journal of Nervous and Mental Disease* 126: 421-28; May 1958.
- PAFFENBARGER, RALPH S., and OTHERS. "The Picture Puzzle of the Postpartum Psychoses." *Journal of Chronic Diseases* 13: 161-73; February 1961.
- PALEY, AARON; NACMAN, MARTIN; and DRESSLER, SIDNEY H. "Personality and Tuberculosis: A Re-Examination." *American Journal of Psychiatry* 118: 1027-30; May 1962.
- PENFIELD, WILDER, and ROBERTS, LAMAR. *Speech and Brain Mechanisms*. Princeton, N.J.: Princeton University Press, 1959. 286 pp.
- ROESSLER, ROBERT, and GREENFIELD, NORMAN S. "Incidence of Somatic Disease in Psychiatric Patients." *Psychosomatic Medicine* 23: 413-19; September-October 1961.
- ROSENZWEIG, NORMAN. "Sensory Deprivation and Schizophrenia: Some Clinical and Theoretical Similarities." *American Journal of Psychiatry* 116: 326-29; October 1959.
- RUESCH, JURGEN. "Psychosomatic Medicine and the Behavioral Sciences." (Discussion by William Caudill.) *Psychosomatic Medicine* 23: 277-88; July-August 1961.
- RYAN, JAMES H. "Dreams of Paraplegics." *Archives of General Psychiatry* 5: 286-91; September 1961.
- RYLE, GILBERT. *The Concept of Mind*. London: Hutchinson House, 1949. 334 pp.
- SCHMIDT, LYLE D., and MCGOWAN, JOHN F. "The Differentiation of Human Figure Drawings." *Journal of Consulting Psychology* 23: 129-33; April 1959.
- SELYE, HANS. *The Stress of Life*. New York: McGraw-Hill Book Co., 1956. 324 pp.
- SHAPIRO, ARTHUR K. "The Placebo Effect in the History of Medical Treatment: Implications for Psychiatry." *American Journal of Psychiatry* 116: 298-304; October, 1959.
- SHONTZ, FRANKLIN C. "Severe Chronic Illness." *Psychological Practices with the Physically Disabled*. (Edited by James F. Garrett and Edna S. Levine.) New York: Columbia University Press, 1962. pp. 410-45.
- SHONTZ, FRANKLIN C., and FINK, STEPHEN L. "A Method for Evaluating Psychosocial Adjustment of the Chronically Ill." *American Journal of Physical Medicine* 40: 63-69, April 1961.
- SOLOMON, PHILIP, and OTHERS, editors. *Sensory Deprivation*. Cambridge, Mass.: Harvard University Press, 1961. 262 pp.
- SZAB, THOMAS S. *Pain and Pleasure: A Study of Bodily Feelings*. New York: Basic Books, 1967. 306 pp.
- TIZARD, BARRARA. "The Personality of Epileptics: A Discussion of the Evidence." *Psychological Bulletin* 59: 196-210; May 1962.
- UHR, LEONARD, and MILLER, JAMES G., editors. *Drugs and Behavior*. Part II. New York: John Wiley & Sons, 1960. Papers 17-30, "Objective Assessment of Normal Human Behavior," pp. 273-398; Papers 47-50, "Controlled Subjective Measures," pp. 583-609.
- WEINSTEIN, EDWIN A., and KAHN, ROBERT L. *Denial of Illness*. Springfield, Ill.: Charles C. Thomas, 1955. 176 pp.
- WERTHEIMER, NANCY M. "Rheumatic Schizophrenia." *Archives of General Psychiatry* 4: 379-96, June 1961.
- WHITE, ROBERT W. "Historical Introduction: Origins of Abnormal Psychology." *The Abnormal Personality*. New York: Ronald Press Co., 1956. Chapter 1, pp. 3-53.
- WOLFF, HAROLD G. "A Concept of Disease in Man." *Psychosomatic Medicine* 24: 25-30; January-February 1962.
- WORRELL, PHILIP. "Space Perception and Orientation in the Blind." *Readings on the Exceptional Child*. (Edited by Philip E. Trapp and Philip Himmelschein.) New York: Appleton-Century-Crofts, 1962. pp. 323-49.
- WRIGHT, BEATRICE A., editor. *Psychology and Rehabilitation*. Washington, D.C.: American Psychological Association, 1959. 146 pp.
- WRIGHT, BEATRICE A. *Physical Disability—A Psychological Approach*. New York: Harper & Brothers, 1960. 408 pp.

- ZANE, MANUEL D. "Role of Personality Traits in Rehabilitation Problems." *Archives of Physical Medicine and Rehabilitation* 40: 197-202; May 1959.
- ZISKIND, EUGENE, and OTHERS. "Observations on Mental Symptoms in Eye Patched Patients: Hypnagogic Symptoms in Sensory Deprivation." *American Journal of Psychiatry* 116: 893-900; April 1960.

Additional References

- ALEXANDER, FRANZ. "The Development of Psychosomatic Medicine." *Psychosomatic Medicine* 24: 13-24; January-February 1962.
- BIRCH, HERBERT G.; PROCTOR, FLORRY; and BORTNER, MORTON. "Perception in Hemiplegia. III: The Judgment of Relative Distance in the Visual Field." *Archives of Physical Medicine and Rehabilitation* 42: 639-44; September 1961. (a)
- BIRCH, HERBERT G.; PROCTOR, FLORRY; and BORTNER, MORTON. "Perception in Hemiplegia. IV: Body Surface Localization in Hemiplegic Patients." *Journal of Nervous and Mental Disease* 133: 192-202; September 1961. (b)
- BIRCH, HERBERT G., and OTHERS. "Perception in Hemiplegia. II: Judgment of the Median Plane." *Archives of Physical Medicine and Rehabilitation* 41: 71-75; February 1960.
- BRADY, JOSEPH V. "Ulcers in Executive Monkeys." *Scientific American* 199: 95-100; October 1958.
- BROWN, FRED. "A Clinical Psychologist's Perspective on Research in Psychosomatic Medicine." *Psychosomatic Medicine* 20: 174-80; May-June 1958.
- CIBA FOUNDATION. *Symposium on the Neurological Basis of Behavior*. Boston: Little, Brown and Co., 1958. 400 pp.
- DAVIDS, ANTHONY; DEVAULT, SPENCER; and TALMADGE, MAX. "Psychological Study of Emotional Factors in Pregnancy: A Preliminary Report." *Psychosomatic Medicine* 23: 93-103; March-April 1961.
- EHRENTREICH, OTTO F. "Some Remarks About Soma-Psychic Compared to Psychosomatic Relationships." *Psychosomatic Medicine* 21: 1-7; January-February 1959.
- EPSTEIN, ARTHUR W. "Relationship of Fetishism and Transvestism to Brain and Particularly to Temporal Lobe Dysfunction." *Journal of Nervous and Mental Disease* 133: 247-53; September 1961.
- FEATHERSTONE, ROBERT M., and SIMON, ALEXANDER. *A Pharmacologic Approach to the Study of the Mind*. Springfield, Ill.: Charles C. Thomas, 1959. 428 pp.
- FEIDLEMAN, JAMES K. "The Cultural Circuit in Psychology and Psychiatry." *Journal of Nervous and Mental Disease* 132: 127-45; February 1961.
- FREEDMAN, SANFORD J., and OTHERS. "Sensory Deprivation: Facts in Search of a Theory." *Journal of Nervous and Mental Disease* 132: 17-43; January 1961.
- GREENFIELD, NORMAN S. "Allergy and the Need for Recognition." *Journal of Consulting Psychology* 22: 230-32; June 1958.
- HOOKE, SIDNEY, editor. *Dimensions of Mind*. New York: New York University Press, 1960. 281 pp.
- KALIS, BETTY L., and OTHERS. "Personality and Life History Factors in Persons Who Are Potentially Hypertensive." *Journal of Nervous and Mental Disease* 132: 457-68; June 1961.
- KLABER, M. MICHAEL. "Manifestations of Hostility in Neurodermatitis." *Journal of Consulting Psychology* 24: 116-20; April 1960.
- KURIE, LAWRENCE S. "Where Vital Things Happen." *American Journal of Psychiatry* 116: 673, 690-94; February 1960.
- LEBOVITS, BENJAMIN Z., and LAKIN, MARTIN. "Body Image and Paralytic Polio-myelitis." *Journal of Nervous and Mental Disease* 125: 518-23; October-December 1957.
- LEVI, AURELIA. "Orthopedic Disability as a Factor in Human-Figure Perception." *Journal of Consulting Psychology* 25: 253-56; June 1961.
- LEVIN, MAX. "The Mind-Brain Problem and Hughlings Jackson's Doctrine of Concurrence." *American Journal of Psychiatry* 116: 718-22; February 1960.
- LEVINE, EDNA S. *The Psychology of Deafness*. New York: Columbia University Press, 1960. 383 pp.
- MCCARTAN, WILLIAM. "Monism and Dualism: New Lamps for Old." *Journal of Mental Science* 107: 809-18; September 1961.

- MCGEER, PATRICK L. "Mind, Drugs, and Behavior." *American Scientist* 50: 322-38; June 1962.
- MATARAZZO, RUTH G.; MATARAZZO, JOSEPH D.; and SASLOW, GEORGE. "The Relationship Between Medical and Psychiatric Symptoms." *Journal of Abnormal and Social Psychology* 62: 55-61; January 1961.
- MEYER, BERNARD C. "Some Psychiatric Aspects of Surgical Practice." *Psychosomatic Medicine* 20: 203-14; May-June 1955.
- MEYERSON, LEE. "Review of the Month: The Psychology of Deafness." *Rehabilitation Literature* 22: 365-67; December 1961.
- MUELLER, ALFRED D. "Psychologic Factors in Rehabilitation of Paraplegic Patients." *Archives of Physical Medicine and Rehabilitation* 43: 151-59; April 1962.
- MURPHY, GEORGE E., and OTHERS. "Life Stress in a Normal Population: A Study of 101 Women Hospitalized for Normal Delivery." *Journal of Nervous and Mental Disease* 134: 150-61; February 1962. (a)
- MURPHY, GEORGE E., and OTHERS. "Stress Sickness and Psychiatric Disorder in a 'Normal' Population: A Study of 101 Young Women." *Journal of Nervous and Mental Disease* 134: 228-36; March 1962. (b)
- MYKLERUST, HELMER R., editor. *The Psychology of Deafness: Sensory Deprivation, Learning and Adjustment*. New York: Grune & Stratton, 1960. 393 pp.
- NORRIS, MIRIAM; SPAULDING, PATRICIA J.; and BRODIE, FERN H. *Blindness in Children*. Chicago: University of Chicago Press, 1957. 173 pp.
- RIKLAN, MANUEL; WEINER, HERMAN; and DILLER, LEONARD. "Somato-Psychologic Studies in Parkinson's Disease." *Journal of Nervous and Mental Disease* 129: 263-72; September 1959.
- SHATIN, LEO; BROWN, PAULA; and LOIZEAUX, MARION. "Psychological Remotivation of the Chronically Ill Medical Patient: A Quantitative Study in Rehabilitation Methodology." *Journal of Chronic Diseases* 14: 452-68; October 1961.
- SHONTZ, FRANKLIN C.; FINK, STEPHEN L.; and HALLENBECK, CHARLES E. "Chronic Physical Illness as Threat." *Archives of Physical Medicine and Rehabilitation* 41: 143-48; April 1960.
- SIMON, ALEXANDER; HERBERT, CHARLES C.; and STRAUS, RUTH, editors. *The Physiology of Emotions*. Springfield, Ill.: Charles C. Thomas, 1961. 248 pp.
- SPIGEL, E. A. "Neurological Aspects of the Mind-Body Problem." *Journal of Nervous and Mental Disease* 125: 614-21; October-December 1957.
- STOLLER, ROBERT J., and EYERS, FLOYD M. "Suicides in Medical and Surgical Wards of General Hospitals." *Journal of Chronic Disease* 12: 592-99; December 1960.
- SEAY, THOMAS S. "The Myth of Mental Illness." *American Psychologist* 15: 113-18; February 1960.
- THIEME, LEE, and MURPHY, ODDIST D. "Acceptance of the White Cane and Hope for the Restoration of Sight in Blind Persons as an Indicator of Adjustment." *Journal of Clinical Psychology* 17: 208-209; April 1961.
- TITCHENER, JAMES L., and LEVINE, MAURICE. *Surgery as a Human Experience*. New York: Oxford University Press, 1960. 285 pp.
- VERNER, CLAIRE M.; STAFFORD, JOHN W.; and KRUGMAN, ARNOLD D. "A Factor Analysis of Indices from Four Projective Techniques Associated with Four Different Types of Physical Pathology." *Journal of Consulting Psychology* 22: 433-37; December 1958.
- WALSH, HIRSH, and ZAKS, MIRRA S. "Studies of Body Image in Men with Spinal Cord Injury." *Journal of Nervous and Mental Disease* 131: 121-27; August 1960.
- WEISS, PETER, and EMMERICH, WALTER. "Dependency Fantasy and Group Conformity in Ulcer Patients." *Journal of Consulting Psychology* 26: 61-64; February 1962.

Index to Volume XXXII

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with a topic.

- Ability, high-level: tests of, at elementary-school level, 5
- Ability, intellectual: distinguished from capacity, 18; measures of, 18
- Ability to learn: tests as measures of, 17
- Academic major, choice of: prediction of, 36
- Accidents: legal liability for, 510; proper attitudes in prevention of, 507
- ACE Psychological Examination for College Freshmen*: effect of educational achievement on, 20; factor analysis of, with achievement tests, 45; prediction of college grades, 16
- Achievement, educational: development and application of tests of, 40
- Achievement motive: construct validity of, 71; effect of verbal instructions on, 47; measurement of, 64; relation of, to vocational choice and interests, 56; relations of measures of, 53; stability reliability of, 68
- Achievement, prediction of academic: by personality schedule, 52; by psychological inventory, 55; from projective measures, 72, 73; in college, 28, 30; in college by anxiety scales, 54; in college, with discriminate function, 36; in high school, 27; in junior college, 30; long-range, with achievement tests, 43
- Achievement tests: confusion of, with aptitude tests, 25; factor analysis of, 45; methods of scaling, 40
- Acquiescence response set: independence of, from social-desirability set, 58; study of, 86
- Adjustment, teachers' ratings of: relation of, to anxiety scale, 54
- Administration and/or supervision: Canada, 237; New Zealand, 225; Peru, 257; Spain, 350; United Kingdom, 355; Yugoslavia, 333
- Administration of instructional materials: college and university programs, 202; county and state audiovisual-instructional-materials programs, 198; dissemination studies, 197; national evaluative criteria, 196; physical-facilities and equipment studies, 204; professionalization studies, 195; school and school-system programs, 201; school trends, 194
- Administration of tests: detection of non-standard, 7; effect of method of, on projective tests, 67; studies of, 7
- Administration of vocational education: evaluation, 371; financing, 371; organization, 370
- Admission, college: selection of tests for, 6
- Adolescence: Australia, 221; Japan, 270
- Agricultural education: adjusting to agricultural changes, 387; continuing education for farmers, 390; course content and teaching procedures, 389; evaluation, 384; general or nonvocational agriculture, 388; general studies, 385; higher education, 388; nonfarm occupations, relationship to, 386
- Anxiety scales: studies of, 53
- Anxiety, test: studies of, in relation to achievement, 46
- Aptitude, special: development and application of tests of, 25
- Aptitude testing: confusion of, with achievement testing, 25
- Assessment of physical fitness: cardiovascular measures, 516; maximum oxygen intake, 516; physical performance tests, 516
- Audiovisual communications: theoretical formulations, 119
- Audiovisual materials, effectiveness of: filmstrip, slides, and transparencies, 144; motion pictures, 141; pictorial illustration and graphic materials, 146; recordings and radio, 147; three-dimensional materials, 148
- Audiovisual materials, utilization of: 150
- Audiovisual theoretical concepts: cafeteria of materials, 120; concrete-to-abstract relationship, 120; major, 119; technical theory relating to equipment, 121
- Australia: adolescence, 221; measurement, 222; preschool and primary-level education, 217; reading, 217; school attainment, 218; school subjects, 217; special education, 219; speech, 218; spelling, 218; television, impact of, 222; university students and university problems, 219
- Bilingualism: effect of, on test scores, 19
- Biochemical factors: as influence on mental health, 468; schizophrenia in relation to, 534
- Biographical data: use of, to predict creativity, 94
- Biographical inventory: use of, to predict creativity, 97
- Business education: automation and office work, 412; basic business and economic education, 413; bookkeeping and accounting, 413; clerical practice, 414; curriculum, 411; stenography, 414;

- teacher preparation, 412; typewriting, 415
- Canada: administration and supervision, 237, 243; curriculum and methods of teaching, 238; educational psychology, 239; measurement, 238; organizations devoted to research, 234; research journals, 236; research methods, 237, 243; research trends, 237; teacher training, 240; utilization of student resources (Atkinson Study), 241
- Capacity, intellectual: measures of, 18
- Career planning, job placement, and follow-up: general education, 378; general theory of vocational development, 377; specific occupational programs, 379
- CEEH Scholastic Aptitude Test: effect of educational achievement on, 20; low prediction of college grades for scholarship winners, 16; use of, with DAT to predict grades, 27
- Censorship: related to content analysis, 130
- Chance success, correction for; use of formula for, 8
- Change: assessment of, 10
- Chile: articulation and matriculation problems, 251; characteristics and orientation of educational research, 250; education and social change, 252; selection systems for university students, 252
- Classification, differential: review and discussion of, 78
- Clinical judgments: prediction of, 79
- Clinical vs. actuarial prediction: complete analysis plan for, 79
- Coaching: effect of, on test scores, 20
- College programs in home economics: characteristics and abilities of students, 392; philosophy, 396
- Communication process: models of, 123
- Comparison of programmed instruction with conventional instruction: relative effectiveness of each approach, 185; trends and problems of methodology, 186
- Concepts of education in relation to mental health: 444, of mental health, 441; of mental health within educational process, 447, training in, 444
- Content analysis, censorship related to, 130; language arts, 128; mathematics and science, 129; social studies, 128
- Correlation, canonical: new computation procedure for, 79
- Correlation coefficient: analysis of variance test of, 81; sampling variances of canonical, zero-order, and multiple, 80
- Creativity, criteria of, 99; development and application of tests of, 91; factor analysis of tests of, 33; measures of, 71; multivariable approaches to, 94; single-test studies of, 97; traditional measures of, 92
- Criteria: of creativity, 99
- Cultural and social factors in mental health: factors affecting illness and health, 455
- Curriculum: business education, 411; distributive education, 419; industrial arts, 404; technical education, 428
- Curriculum: Canada, 238; East Africa, 295; French-speaking countries, 299; New Zealand, 226; Sweden, 328; United Kingdom, 354; Yugoslavia, 334
- Decision theory: interpretation of scores of low reliability in, 84; relation of reliability estimation to, 81
- Delinquency: Japan, 269; New Zealand, 228
- Design of printed materials: discussion of, 132
- Difference scores: proper evaluation of, 9; standard error of measurement of, 84
- Differential Aptitude Tests: research studies of, 27
- Disability, psychological aspects of: 534
- Discriminating power of test items: index of, in particular region of score range, 83; indexes of, 85
- Distortion of scores, intentional: in personality tests, 59
- Distributive education: curriculum and instruction, 419; evaluation and follow-up, 420; objectives and philosophy, 418; organization and administration, 419; suggested future research, 421
- Early identification of children with developing mental health problems: 450
- East Africa: child development, 294; curricula, 295; educational sociology, 294; language problems, 296; measurement, 294
- Education of emotionally handicapped children: psychoeducational approaches to, 450
- Educational psychology: Canada, 239; New Zealand, 228; Spain, 348; United Kingdom, 356; Yugoslavia, 337
- Educational sociology: East Africa, 294; Finland, 323; Israel, 288; New Zealand, 228; Spain, 349
- Edwards Personal Preference Schedule: studies of, 52
- Ego development: in educational processes, 447
- Emotionally handicapped children: early identification of, 450; psychoeducational approaches to education of, 450
- Environment: effect of, on intelligence, 19

- Experimental work in fitness: cardiovascular endurance, 525; flexibility, 525; muscular strength, 524
- Factor analysis: of *MMPI* scales, 52; of personality questionnaires, 55; of personality schedule, 53; of personality tests, 56; use of, with achievement tests, 45
- Factors affecting illness and health: cross-cultural studies, 456; cultural and social, 455; environmental-demographic research, 456
- Factors influencing individual mental health: biochemical agents, 468; entities in childhood period, 467; family role, 466; maternal patterns, 464; ordinal position of siblings, 466; perceptual causation, 469; schizophrenogenic mothers, 465; sensory deprivation, 469; separation from mother, 467; soft mothers, 467; teachers' mental health in relation to that of children, 487
- Faking: effect and control of, in personality tests, 59
- Family role: 455
- Filmstrips: effectiveness of, 144
- Finland: child development, 322; differentiation of abilities and attitudes in children, 325; educational attitudes and teachers' roles, 324; main research emphases, 320; measurement, 321; methods of teaching, 322; social psychology and sociology of education, 323
- Finn's Law: discussion of, 122
- Fitness: experimental work in three facets of, 524
- Fitness of children and youth: comparisons based on motor performance tests, 518; comparisons based on physiological measures, 518
- Foreign language aptitude: test of, 32
- French-speaking countries (Belgium, France, Switzerland): child growth and development, 303; curriculum and instruction, 299; guidance and testing, 302; teaching materials, production of, 301; teaching personnel, 305
- Gifted child: tests for identification of, in elementary school, 5
- Graduate Record Examinations: prediction of graduate performance, 16
- Graphic materials: effectiveness of, 146
- Growth, measurement of: problems in, 10
- Health education: Bronfenbrenner School Health Education Study, 495; curricular organization and methodology, 500; evaluation studies, 501; knowledge, attitude, and practice studies, 498; needs and interests in, 497; philosophical and historical studies of, 496; studies related to health content, 499; teacher education, in relation to, 501; trends in, 497
- Health of school-age children and youth: 520
- History of vocational education: 370
- Home economics education: attitudes toward, and its teachers, 396; basis for program development, 394; college programs, 396; elementary and junior high school, 393; evaluation, 395; historical studies, 397; secondary school, 394; suggested future research, 398; teacher education, 397
- Homogeneity, coefficient of high: as criterion for achievement-test excellence, 40
- Illustration: effectiveness of pictorial, 146; in printed materials, 132
- Individual mental health, factors influencing: 464
- Industrial arts: curriculum and achievement, 401; foundations, 402; learning, 403; teacher education, 403
- Industrial education: industrial arts, 402; vocational-industrial education, 405
- Instructional materials: administration of, 194; use of, in language laboratories, 169
- Instructional television: effectiveness of learning from, 156; questions suggested by studies of, 160; student attitudes toward, 160; teacher attitudes toward, 162
- Intellectual skills: development and application of tests of, 15
- Intelligence: effect of environmental variables on, 19; relation of, to creativity, 92
- Interest inventories: as predictors of creativity, 98; studies of, 56
- Interpersonal relations: measures of, 58
- Interpretation of test scores: bases for, 9
- Investment and economic development: role of vocational and technical education: 373
- Iowa Tests of Educational Development: and prediction of college grades, 44; prediction of, in high school by elementary school tests, 43; use of, in factor analysis, 46
- Israel: child-care services, 281; children from underdeveloped strata in school system, 286; follow-up of graduates, 282; gifted children from underdeveloped strata, 290; intellectual development, 289; school-adjustment problems, 289; socioeducational studies, 288; test development, 281
- Item analysis: computing methods for, 85; studies of, 84
- Japan: adolescence, 270; developmental studies, 265; group dynamics in class-

- room, 266; intelligence and intelligence tests, 268; mass media, effect of, 270; parent-child relationships, 272; personality formation, 272; personality tests and projective techniques, 269; problem children and delinquents, 269; special education, 266; teaching-learning process, 271; teaching methods, 265, 271
- Joint Commission on Mental Illness and Health: 460
- Kuder-Richardson formula: relation of, to test-score theory, 80; studies of, 81
- Language arts: printed materials for, 128
- Language laboratory: as teaching machine, 174; equipment in, 172; history of, 168; instructional materials in, 169; rationale for equipment in, 171
- Latin American countries: Chile, 250; overview of educational research, 247; Peru, 255; problem areas, 247; Puerto Rico, 261; recommendations, 248
- Leadership roles, assumption of: relation of, to personality factors, 57
- Learner characteristics: discussion of, 149
- Learning ability: tests as measures of, 17
- Learning from television: effectiveness of, 156
- Learning spaces: design of, 123
- Linear regression: as model for theory of test scores, 80; use of, to build multiple-variable prediction equations, 78
- Manpower and education: education and economic growth, 369, 424; national manpower demand, 424
- Maternal patterns: influence on mental health, 464
- Mathematics and science: printed materials for, 129
- Measurement and evaluation: Australia, 222; Canada, 238; East Africa, 294; Finland, 321; French-speaking countries, 302; Israel, 281, 282, 289; Japan, 268; New Zealand, 227; Puerto Rico, 262; Yugoslavia, 335
- Measurement theory: discussion of, 11, 80
- Medical school: prediction of success in, 33
- Mental ability, general: development and application of tests of, 15
- Mental health: cultural and social factors in, 455; educative process, in relation to, 461; ego development in educational processes in relation to, 447; Joint Commission on Mental Illness and Health, 460; school and community programs in, 476; school personnel in relation to, 484
- Mental health and school personnel: influences of teachers' mental health upon children, 487; nonteaching personnel, role of, 490; personal-professional factors, 489; psychopathology in teachers, 488; teacher characteristics, 488; teachers' perception of children's behavior, 486; training in mental health concepts, 484; values open to question, 491
- Mental health in education: concepts of mental health and of education, 441; early identification of children with developing problems, 450; factors in school achievement, 447
- Minnesota Multiphasic Personality Inventory: studies of, 51
- Mortality and morbidity: 520
- Motion pictures: effectiveness of, 141
- Multiple-choice items: effect of violation of principles for constructing, 40; preparation of, from free-response items, 6; scoring of ranking type, 85
- Multitrait-multimethod matrix: description of, 66, 83; use of, for evaluation of construct validity, 26
- New Zealand: administration, 225; curriculum, 226; delinquency, 228; educational psychology, 228; educational sociology, 228; history and theory of education, 225; physical development, 228; policy, 225; special education, 229; teachers, 230; teaching methods, 229
- Norms, test: studies of, 86
- Nutrition in relation to health: 522
- Objectivity of projective testing: 69
- Organizations devoted to research: Canada, 234
- Paperback books: discussion of, 134
- Perceptual-motor tests: studies of, 31
- Perceptual processes: as indicators of mental health, 469
- Performance tests: as measures of intellectual capacity, 18
- Personality: disease, in relation to, 523; general dimensions of, as shown by factor analysis, 56
- Personality characteristics: inclusion of measure of, in creativity measures, 94; relation of, to achievement tests, 46
- Personality development: underlying patterns and processes, 458
- Personality inventories: studies of, 54
- Personality, projective tests of: development and application of, 64
- Personality, structured tests of: development and application of, 51
- Peru: intellectual growth, 255; school achievement, 256; school administration, 257; vocational counseling, 259
- Physical development: New Zealand, 228

- Physical education: youth fitness in relation to, 523
- Physical fitness: American children and youth, 517; assessment of, by cardiovascular measures and tests of maximum oxygen intake, 516; estimates of, by physical performance tests, 516; factors affecting or associated with, 519; nature and assessment of, 515
- Physical growth trends: 521
- Physical illness and stress: disease and personality, 533; psychological aspects of disability, 534; reactions to, 532
- Point-biserial correlation coefficient: as index of item discrimination, 85
- Poland: future objectives, 345; recent developments, 344
- Prediction: by means of achievement tests, 43; review and discussion of methods of, 78
- Preschool and primary-level education: Australia, 217
- Printed materials: design of, 132; illustration of, 132; paperback books, 134; trade books, 134; use of, 127, 133; workbooks, 134
- Professional schools: assessment and prediction of success in, 33
- Profile, test-score: evaluation of differences in, 9; interpretation of, 10; on Wechsler tests, 21; studies of analysis of, 83
- Program variables: adaptation of, to individual differences, 184; definition of response modes, 180; discussion of, 179; eliciting desired responses, 181
- Programmed instruction vs. conventional instruction: relative effectiveness of each approach, 185; trends and problems in methodology, 186
- Programmed materials: discussion of, 179
- Programmed textbooks: studies of, 132
- Projective tests: development and application of, 64; relation of, to direct measures of same characteristics, 67; reliability and stability of, 68; systematic classification of, 64
- Psychoeducational approaches to education of emotionally handicapped children: 450
- Psychopathology in teachers: 488
- Psychotics: discrimination of, from neurotics by test, 51
- Radio: effectiveness of, 147
- Rater-rate-trait matrix: handled by analysis of variance, 81
- Rating reliability: analysis-of-variance approach to, 82
- Reactions to physical illness and stress: 532
- Readability: studies of, 130
- Reading competency: as factor in achievement tests, 46
- Reading-test performance: effect of test anxiety on, 47; impairment of, by periodic interruptions, 41
- Recordings: effectiveness of, 147
- Relevance, test-item: difficulty and discrimination of, 40
- Reliability: internal consistency, as overestimate, 11; logical foundation of concept of, 11; prediction of, from item characteristics, 83; sampling problems related to, 81; studies of, 81; test of zero, 82
- Reliability formulas: relation of, to various statistical concepts, 82
- Reliability, stability: of projective measures, 68; of specific tests, 15
- Reporting of test scores: discussion of means of, 9
- Research methods: Canada, 237, 243; Yugoslavia, 338
- Response set: effect of, on tests, 58; studies of, 86
- Retarded children: stability of IQ scores of, 16; transfer of training in, 18
- Safety centers in colleges and universities: 511
- Safety education: athletics, physical education and recreation, 509; dissemination of research in, 511; driver and traffic safety, 508; importance of proper attitudes in accident prevention, 507; nature of completed research in, 506; programs in schools, 507; pupil transportation, 510; teacher preparation, 510
- Sampling plans: for test norming, 87
- Scalability: of achievement tests, 41
- Scale transformations: studies of, 86
- Scaling, test-score: studies of, 82
- Scandinavian countries: Finland, 320; Sweden, 327
- Schizophrenogenic mothers: 465
- School and community mental health programs: conceptual and philosophical developments in, 476; research and evaluation of, 479; techniques in, 477; utilization of teachers and other professional persons in, 479
- School attainment: Australia, 218
- School personnel, mental health characteristics of: 484
- School subjects: Australia, 217; New Zealand, 229; United Kingdom, 354
- Scoring, test: problems of, 42; special approaches to, 85; studies of, 8
- Self-teaching devices: discussion of, 179
- Self-teaching devices and programmed materials: summaries and reviews of, 179
- Siblings, ordinal position of: 466

- Situational factors: role of, in projective testing, 67
- Skill development: 371
- Slides: effectiveness of, 144
- Social studies: printed materials for, 128
- Social trends: affecting audiovisual research, 119
- Sociology and psychology of work: 368
- Soft mothers: 467
- Somatic-psychological interaction in physical and mental health: basic conceptual problems, 530; current general trends, 532
- Spain: administration, 350; educational psychology, 348; educational sociology, 349; family education, 350; guidance, 350; philosophical and historical literature, 347; teaching methods, 349
- Special education: Australia, 219; Japan, 266; New Zealand, 229
- Specific occupational programs: 379
- SRA Primary Mental Abilities*: research studies of, 28
- Standard error of measurement: appropriate form of, for various average scores, 81; of difference scores, 84; relation of, to test length, 81
- Statistical methods: for test construction and evaluation, 78
- Stimulus properties: role of, in projective testing, 69
- Stress and physical illness: disease and personality, 533; psychological aspects of disability, 534; reactions to, 536
- Sweden: achievement testing and school marks, 329; content of curriculum and methods of instruction, 328; differentiation of pupils, 327; reading, 329; teacher selection and training, 330
- Systems approach: discussion of, 122
- Teacher training: Canada, 240; Sweden, 330; United Kingdom, 355
- Teachers: changing role of, 123; characteristics of, 488; influence of mental health of, upon that of children, 487; personal-professional factors, 489; psychopathology in, 488
- Teachers and teaching personnel: Canada, 240; French-speaking countries, 305; New Zealand, 230; Sweden, 230; United Kingdom, 355; Yugoslavia, 338
- Teaching: by electronic or mechanical means, 124
- Teaching methods: Canada, 238; Finland, 322; Japan, 265, 271; New Zealand, 229; Spain, 349; Sweden, 328; United Kingdom, 354; Yugoslavia, 334
- Technical education: assessment of basic need, 423; curriculum, 428; enrollment, 428; programs and institutions, 428; regional and local studies, 428; research and institutional planning, 425; state-wide studies of post high school education, 425; state-wide studies of technical education, 426; suggested future research, 430; technical education and junior college, 429; technical institute, 429
- Television: Australia, 222; Japan, 270; instructional, 156
- Test anxiety: effect of, on test performance, 20; relation of, to projective indicators of questionnaire measure of, 67; studies of, in relation to achievement, 46
- Test items measuring fact vs. interpretation: difficulty and discrimination of, 40
- Test results: use of, 5
- Test scores: theory of, 80
- Test scoring: problems of, 42; special approaches to, 85; studies of, 8
- Tests: bibliography of, 5; development of, 5; specific information about, 5; statistical methods for construction of, 78
- Tests, standardized achievement: guidelines for use of, 6
- Tests, survey of use of: in colleges and universities, 6; by teachers trained in guidance institutes, 6
- Textbooks: availability of, 127, 135
- Textual variables: illustration and design, 132; programmed textbooks, 132; readability, 130; typography, 131
- Thematic Apperception Test*: compilation of research on and studies of, 64
- Three-dimensional materials: effectiveness of, 148
- Transparencies: effectiveness of, 144
- True scores: discussion of, 80
- Typography: studies of, 131
- United Kingdom: abilities and thought processes, 357; cultural and family factors, 356; educational psychology, 356; motivation, 355, 357; personality, 357; school and school-system organization, 355; school subjects, 354; teacher selection and training, psychological variables in, 355; teaching methods, 354
- University problems: Australia, 219
- Use of materials for individual and group learning: 121
- Utilization of audiovisual materials: 150
- Validation of projective tests: method for, 66
- Validity coefficients: effect of self-selection on interpretation of, in academic selection, 35
- Validity, construct: of anxiety scale, 54; of aptitude tests, 26; discussion of, 11; method of determining, 26; of personality scale, 52; of projective tests, 65
- Validity, predictive: of specific tests, 16

- Vocational development: theory of, 377
- Vocational-industrial education: interests and aptitudes, 405; learning, 406; programs, 407; teacher education, 405
- Vocational, technical, and practical arts education: administration of vocational education, 370; current status of research, 367; history of, 370; international studies, 372; investment and economic development role of, 373; manpower and education, 369; skill development, 371; sociology and psychology of work, 368; terminology, 368
- Wechsler Adult Intelligence Scale*: factor analysis of, 21; relation of, to separate measures of learning, 21; 10-year stability of scores on, 10; use of, in prediction of college grades, 16
- Wechsler Adult Intelligence Scale Vocabulary Test*: use of, in factor analysis, 31
- Wechsler Intelligence Scale for Children*: as predictor of arithmetic comprehension, 17; factor analysis of, 20; review of literature on, 20; shortened forms of, 20
- Weights, differential: study of, for test items, 86
- West Germany: Becker and Teschner Study, 317; 1955 Advisory Memorandum, 314; 1960 Awakening, 315; post World War II political education, 308; sociological study of Frankfurt students, 312
- Wherry-Doolittle method: application and explanation of, 78
- Youth fitness and health: physical education in relation to, 523
- Yugoslavia: administration, 333; curriculum and teaching methods, 334; educational psychology, 337; educational sociology, 337; financial resources, 333; measurement, 335; mental and physical development, 338; research methods, 338; teacher personnel, 338